PSYCHOSOMATIC MEDICINE

Experimental and Clinical Studies

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PSYCHOSOMATIC MEDICINE

EXPERIMENTAL AND CLINICAL STUDIES

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PURPOSE: The aim of PSYCHOSOMATIC MEDICINE is to encourage and bring together studies which make a contribution to the understanding of the organism as a whole, in somatic and psychic aspects. The field to which PSYCHOSOMATIC MEDICINE is devoted is rapidly assuming importance in medicine and the related sciences. The traditional body-mind dichotomy, while now less present in medical thinking, is not eradicated from language. Expressions which, during the last decade, have gained increasing prominence in medical literature, such as the organismal theory, the patient as a whole, psychosomatic problems, psychophysiology, psychobiology, were all attempts to avoid the artificial division of the psychological from the physiological. It is now realized that the major problem is not to find the term or label to indicate the essential unity of the organism, or to engage in philosophical discussions about monism, dualism or parallelism, but to develop practical methods for dealing clinically and scientifically with the organism as a whole. Although the organism is a unit, fundamentally different methods have been developed for the observation and management of the psychic and somatic functions. This fact is the real reason for the use of the term psychosomatic, not any difference of opinion about the essential nature of the organism.

The ability to deal with the psychic aspect of an illness, or with the patient as a person, has been called the art of medicine in contradistinction to the science of medicine. But this association of ideas has tended to preserve a dichotomy. Most physicians would agree that there is an art and a science for dealing with physiology as well as psychology. The fact that studies relating to them tend to be isolated from each other in our scientific literature constitutes the reason for this publication.

Psychosomatic medicine is not a medical specialty, parallel with internal medicine or psychiatry, but an approach which might be applicable to almost any medical, psychological or physiological problem. The consequence is that nearly anything the Journal publishes might be suitable for one or another of the specialized scientific journals, yet its suitability for this Journal depends not only on its scientific excellence but also upon its pertinence to some specific issue involving observations or experiments on both personal reactions and organic reactions.

SCOPE: The investigations published in this Journal will deal primarily with phenomena observed concurrently from somatic and psychic aspects rather than from either one alone. The scope therefore will include appropriate experimental studies of animal and human behavior, and well-controlled clinical studies of children and adults. Pertinent examples are: investigations of experimental neuroses, of frustration, of physiological changes accompanying emotion, of vegetative and hormonal disturbances, and of psychiatric aspects of general and specific emotional problems.

The Editors are not disposed to accept manuscripts which present purely psychiatric material without observations and data relative to physiological events, or material relating to any of the specialties of internal medicine which is not accompanied by sufficiently adequate observations to throw light on the psychosomatic mechanisms involved.

The Journal includes articles containing reviews of literature in the field of the medical and research specialties.

Reviews of articles and books relating to this field will also be published.

MONOGRAPHS: To meet the increasing need for publication of experimental data resulting from longer studies, monographs independent of the Journal itself will be published as occasion requires.

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CRITERIA FOR THERAPY IN PSYCHOSOMATIC DISORDERS

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The criterion of psychosomatic health is maintenance by the organism of homeostatic equilibrium within itself and within its environmental field. Hence there is need for a new approach to classification of the subject matter of medicine, based on psychosomatic concepts. The major contributions to these concepts have come from physiologists on the one side and from medical psychologists on the other. But it has been difficult to establish common points of reference and common terms for these two disciplines. Traditional nosology is inadequate in both psychiatric and somatic phases, and there is little contact between their terminologies. The disease entities now recognized in each of these fields have little relevance either to the organism as a whole or to the *organism-environment continuum*.

What is needed is a system of classification which will aim, not at defining disease entities in the traditional sense, but rather at describing dynamic processes in ill persons. It should begin with the organism-environment continuum, and its material should relate to the flow of energy in a field of tension. It should lend itself to quantitative measurement, assuming that the appropriate techniques can be devised.

Thus, in the case of hypertension, the name should suggest the energy economy of the particular organism in its environmental situation, together with both behavioral and somatic symptoms. It should be capable of minor variation to parallel the minor variations of personality and symptom found within the general class. With such a nosology medical thinking would be clarified and communication among specialists would be facilitated.

Where in psychiatric nosology can one find the name for the emotional and behavioral syndrome which seems to be associated with the physical symptoms called hypertension? What of use does the name tell us about the variations in the associated personality profile, and particularly in the manner of defense against the focal conflict, which appear to make a critical difference in the course of the illness and in its response to therapy?

It is suggested that an adequate nosology can be best developed by the use of mathematical symbols such as are employed in the more mature sciences, like physics. This suggestion will be elaborated in a subsequent paper.

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There is a habit of speaking of psychosomatic diseases, as if some diseases were not psychosomatic. Similarly, some people think of psychosomatic medicine as a specialty dealing with a limited group of diseases, like dermatology and ophthalmology. But, as a matter of fact, psychosomatic is merely an adjective describing a conceptual approach to the human organism and all its ailments, though perhaps more essential in the diagnosis and treatment of some patients than of others.

The dichotomy which, it is often felt, is implied by the terms psyche and soma does not exist in the organism itself, but has grown out of the manner in which scientific method has been applied in medicine. The psychosomatic method is merely a stereoscopic superposition of the images derived from the two principal groups of techniques which medicine has employed, the physiological and the psychological. The perspective so obtained should be valuable in dealing with all human diseases, even with some not yet recognized as disease entities.

In a 14-year study of serial admissions to a general hospital, now published under the title "Psychosomatic Diagnosis", problems of diagnosis were particularly emphasized. Attention was called to the need for radical change in diagnostic principles and nosology.

After this study was completed the diagnostic principles outlined were tested for practical application in the regimen of therapy. This was done in the same hospital during the last two years, using follow-up examinations of patients included in the published study, as well as a new group of serial admissions. It appeared that rational therapy demands not only accurate psychosomatic diagnosis, but also an evaluation of the stage of progress of the disease. Perhaps the most interesting observation is that there seems to be a parallelism between degree of crystallization of physiological dysfunction in somatic damage and degree of crystallization of psychological defenses in characterological armor. About one-half of the patients studied, and carefully diagnosed by means of the personality profiles, reached the hospital not only at a time when the somatic damage was so great that little more than palliative aid was possible, but also at a stage when the psychosomatic defenses were so rigid as to preclude rational therapy without creating a dangerous disequilibrium of the organism as a whole.

A special study of this material has been made during the past year and will illustrate the foregoing

points on the basis of clinical observations, especially by Arlow. The material which follows is Dr. Arlow's presentation of these observations.

The association of characteristic personality patterns and conflicts with many different syndromes has been demonstrated. The fact remains, however, that even with similar profiles and focal conflicts, the course of the disease varies widely from patient to patient. So does the response to therapy. Since psychotherapy is available to only a few patients it was decided to study within the borders of the disease entity the psychosomatic factors which influence the course of the illness and the responsiveness to therapy.

It would appear that the availability and lability of the defensive mechanisms are of utmost importance in influencing the clinical course and the therapeutic possibilities in psychosomatic disorders. If physiological and psychological responses are separate but related manifestations of the total adaptive reaction of the organism, it should be possible to correlate their function in the disease picture. This is especially true since illness in the biological sense represents a failure of the organism's adaptability. Accordingly, this study was undertaken to test these hypotheses directly on clinical material and in so doing to clarify the criteria for psychotherapy. The clinical material consisted of serial admissions of cardiac patients between the ages of 15 and 50 to the wards of the Presbyterian Hospital. Psychiatric studies were supplemented by Rorschach and other projective techniques. Five cases of hypertension or hypertensive heart disease will be presented to illustrate the application of these principles. Although the correlation in the case of the patients with coronary occlusion was even more striking, it is impossible in a study of this nature to present all the cases.

In the hypertensive group there is a high degree of uniformity of the psychological constellation. All the cases studied conform to the general pattern which Alexander, Saul and others have observed in their studies on hypertension. In these there is a conflict between a masochistic, submissive, oral dependent attitude toward a dominating parent or substitute and a chronic, unsuccessful rebellion with hostility and resentment against this attitude. This basic similarity is emphasized to facilitate concentration on the differences as they appear concretely in the individual patient.

Case No. 1. J. C., a 42 yr. old female with hypertension of 5 years' duration, was admitted to the hospital for acute congestive heart failure. There was no family history of hypertension. A few months before admission she had sustained a cerebral hemorrhage. She was a very mild diabetic. During her hospitalization her pressure remained relatively high and there was only a slight fluctuation of the pressure readings.

Outwardly the patient was always in good spirits. She denied any anxiety. Throughout her life she solved her problems by suppressing any expression of resentment or hostility and by conforming rigidly to the patterns of behavior prescribed for her by her old-world father. At first she felt this constriction of her life to be antiquated and illogical, but rebellion was very short lived. She accepted these restrictions and superficially made them her own. As a child she was shy and extremely dependent upon her mother. She had frequent nightmares from which she suffered occasionally at the time of this report.

Following her marriage her life became even more narrowed. She had few friends and no interests outside of her immediate family. Her pleasures were primarily oral: eating, drinking, smoking, telling stories. She denied any disappointment at being childless, and indicated that her sexual life was unimportant to her. Her physical illness she allegedly accepted with resignation, but actually she was quite frightened.

Rorschach evaluation of her personality was that of an immature, frightened, emotionally constricted individual who lacked defenses and who was very much repressed instinctively.

Case No. 2. R. S., a 47 yr. old female, but looking older than her age, had hypertension of 5 years' duration. She was admitted to the hospital for congestive heart failure. There was no family history of hypertension. For several months prior to her admission to the hospital she was severely invalided by her illness. She was also a mild diabetic. In the hospital her pressure remained relatively high and showed little tendency to fluctuate.

She was pleasant and compliant, and tended to be optimistic, almost to a pathological degree. She denied any anxiety or equivalent of anxiety. Under this pleasant surface, however, the patient was extremely suspicious and defensive. She resisted, in a passive manner, any thoroughgoing discussion of her family relations or her marriage.

Her life history was that of a shy, dependent child, who grew into a timid, unaggressive woman, devoted only to her job and to her family, even to the exclusion of all other interests. She made no friends and had no hobbies.

She was married for the first time at 40 to a man who was 15 years her senior. From her description her husband was a faultless, indulgent person, who even before the onset of her illness permitted her to evade the responsibilities of married life.

According to the Rorschach she was a rigid and constricted personality whose responses were extremely stereotyped. She had little affective contact with others and was tense and over-controlled. She lacked defenses and avoided responsibility. She expressed her hostility through negativism.

The similarity between these two patients is striking, both in relation to the clinical course of their illness and to the psychological handling of their conflicts. In both instances the course of the illness was rapid and severe. In a relatively short period of time, despite treatment, both entered the hospital for complications of their illness; the arteriolar spasm was fixed and anatomical changes of an irreversible nature

had begun. Anxiety or neurotic traits were minimal or absent. Neither patient could avail herself of any mechanism to express her instinctual drives. Similarly, the pattern of living was constricted. These patients did not employ any of the organized outlets of aggression or emotion. Both patients resisted psychotherapy, as well as any psychological implications of their illness. Because of the state of progression of the illness and the rigidity of the defense system, the prognosis for treatment was considered poor.

In contrast, two cases of hypertension are presented whose clinical course and psychological constitution are different.

Case No. 3. E. G., a 35 yr. old female, known hypertensive for at least 8 years, and with a bad history of hypertension on both sides of the family, was admitted to the hospital for investigation of her disorder. Except for occasional headaches she had been rather well until 1½ years before admission. Several episodes suggestive of either hypertensive encephalopathy or hysteria had occurred. Neurological examination and electro-encephalographic studies were entirely negative and the final impressions of the internist and the neurologist were that these episodes had a great functional element. During hospitalization her blood pressure readings showed a wide range of variability, frequently being at a normal level. During several of the psychiatric interviews she experienced rapid elevation of pressure while discussing some significant problems.

On the ward she was outwardly cheerful and compliant, but did express anxiety over her symptoms and the investigative procedures. This patient was extremely devoted to a very strict mother, although she had resented the strong hand which her mother wielded in her personal affairs. Her hypertension began shortly after her mother's death. It was only then that the patient was able to marry a man who had been courting her for ten years. She continued to work as a bookkeeper and to manage both her own and her father's home. Her work history and her social relations were varied and satisfying.

There were many so-called overt functional elements in her history. These included palpitations of the heart of 18 years' duration. These occurred during the hospital stay and were accompanied by paroxysms of hypertension. There were also transient hypasthenias of the extremities following fainting attacks and attacks of nervousness which she tried to control by consciously suppressing any manifestation of her anxiety.

Unfortunately Rorschach examination was not available on this patient.

Case No. 4. A. S., a 40 yr. old female, entered the hospital for a secondary operation in connection with a previous fracture. In the course of hospitalization hypertension of a mild degree was noted. The patient's mother was a very severe hypertensive cardiac for many years and finally died of congestive heart failure. Pressure readings in the hospital fluctuated widely, especially when some of the patient's fears and character traits were discussed with her. The patient had suspected for many years that she had hypertension but refused to consult a physician for fear that she would find this to be actually the case.

Although superficially ingratiating, the patient's attitude alternated between distrust and belligerence on the one hand, and effusive praise and gratitude on the other.

This patient was the favorite, devoted child, of a very competent and aggressive mother who was the undisputed mistress of her household. Her major identification was with this mother. Of all the siblings, she alone remained unmarried although she had been engaged several times. Psychiatric investigation revealed a definite evidence of sexual fear. In addition the patient had a fear of lightning and of the sight of blood, and was afraid that she, like her mother, would die of hypertension. In an emergency she became panicky and took flight in an outburst of muscular activity. In her business relations the patient was extremely competent but insufficiently aggressive to achieve the position or salary her abilities warranted. She permitted herself occasional outbursts of anger but these were poorly sustained and weak in proportion to her feelings. She was extremely active and prior to her injury was very athletic.

Rorschach evaluation was that of a practical, conventional person with undeveloped creative resources. She was easily disturbed by situations demanding emotional response. She blocked and denied stimuli. This woman had resources for stabilization in her inner life but she seemed unable to develop and apply these resources. She gave the impression of being in a work rut to which she adhered compulsively.

These last two patients were similar to each other and different from the first two presented. In cases 1 and 2, there was no family history of hypertension; in cases 3 and 4, in spite of definite and bad family history of hypertension, both patients had a better prognosis than the earlier ones mentioned. Furthermore, case 3, with at least 8 years of hypertension, was in much better condition than cases 1 and 2 with only 5 years of illness. In these last two cases irreversible anatomical changes or complications of the illness had not as yet occurred. The vasomotor mechanism was still labile and responsive as the physiological component of the total affective reaction. Conflict and resentment were acknowledged and attempts were made, even though with only partial success, to resolve the problems either directly by action or indirectly by such mechanisms as sublimination, displacement, or ultimately by the appearance of anxiety. It would seem that the utilization of these defensive measures served to reduce the amount of tension which had to be discharged in the form of autonomic innervations. In addition, the relative lability of the defense system afforded a means for the further reduction of such tension. The prognosis, therefore, was better and the prospects for psychotherapy brighter.

The last two cases presented are characteristic of the early stage of several psychosomatic disorders in which an affective disturbance finds concomitant somatic expression in the form of autonomic innervations. In

this stage there is a preponderance of the functional elements and the physiological component of the organism's attempts at adaptation is reversible and labile and closely linked to psychic activity. A dynamic interplay exists between the two defensive systems and pertinent influences brought to bear upon one system are reflected by changes in the other.

The first two cases presented represent a later stage in the process. After a varying period of time, with sufficient intensity of the physiological response, a qualitative change seems to occur. The autonomic response becomes fixed, irreversible, and no longer dependent upon the affective state to which it was originally related. Structural changes have occurred and the course of the illness is dependent to a large extent upon the occurrence of complications which are secondary to the structural changes. In the case of hypertension these complications are usually cerebral hemorrhage, congestive heart failure, and occasionally kidney failure. It is usually at this stage that the patient enters the hospital for treatment. By this time the prognosis is usually poor. Similarly the prospects of psychotherapy are rather dim because, in addition to the somatic complications which now run their own course, the basic physiologic disturbance is no longer intimately connected with the affective state.

The last case is presented to illustrate the process of transition over a long period of time.

Case No. 5. E. G., a 50 yr. old white female appearing older than her age, after 17 to 18 years of known hypertension entered the hospital for congestive heart failure. She had remained relatively well until about one year before admission. There was no definite family history of hypertension. During the many years of her observation in the clinic the patient's blood pressure was subject to wide ranges of fluctuation. During the past year and throughout the period of hospitalization her pressure was high and remained high.

The patient was apprehensive but established rapport readily. Her life conflict centered about an unhappy marriage into which she was forced by her family because of an earlier scandal. At first she rebelled against the abuse from her n'er-do-well husband but finally submitted because she was dependent upon him. Although she was extremely resentful, she could find no outlet in her increasingly constricted life. She drew more into herself and mistrusted people almost to the point of paranoia. When her husband died a few years before she expressed no regrets.

Unfortunately Rorschach examination on this patient was not available.

This case illustrates the transition between the two phases mentioned above. After an initial period during which the patient attempted by direct action to resolve her problems, her need for dependence became the predominant one. She withdrew from the conflict but when she did so she lacked adaptive resources. Her social contacts were broken off and her life became extremely constricted. The course of the disease then progressed and became increasingly severe.

The appearance of anxiety, when it was not part of an organized neurosis, was a good prognostic sign both in regard to the course and the prospects for psychotherapy. Those cases in which anxiety was more easily mobilized responded better. The defenseless individual was unable to face his anxiety, resisted therapy, and the course of the illness was more severe. The relative lability of the defensive system can be evaluated from the history of the patient's previous adaptation. In addition, the Rorschach examination offers a very useful means of estimating the patient's defensive potentialities. According to our present impression the so-called "dilated" personality can handle his conflict and his illness more successfully and is therefore the more suitable candidate for therapy.

As already mentioned, in the early phase of the illness the physiological response and the affective state form a functioning unit. The earlier the application of therapy, therefore, the more hopeful is the outlook. When the patient enters the hospital, however, it is usually for some complication of a late phase of the illness. It would seem that the most effective procedure would be to detect in the out-patient department those patients in the early phases of the illness who are constitutionally disposed to the disease. Personality profile evaluation and pharmacodynamic and other physiological studies could serve as the basis for the detection of the early cases and for the evaluation of the psychotherapeutic prospects. A more unified concept of the organism's functioning would foster this approach and improve our therapeutic effort.

SUMMARY

1. In this paper, the psychosomatic approach to clinical problems has been defined. Its therapeutic application has been illustrated with special reference to hypertensive cardiovascular disease.

2. It appears that both the indication for psychotherapy and the prognosis for the illness itself depend on the degree of crystallization of the disease process in character defenses, and in the organ system.

3. Present observations, based on a larger series than that here recorded, suggest that as the disease process progresses changes in somatic and character structure become simultaneously irreversible.

4. The psychosomatic approach is more effective early in the disease when there is less character rigidity and less structural damage. Unfortunately, too many patients have their first opportunity for psychosomatic treatment when it is too late for such treatment to be of more than palliative value.

SOME PSYCHOLOGICAL ASPECTS OF SEXUAL PROMISCUITY

Summary of an Investigation

Major E. D. WITTKOWER, R.A.M.C., and Captain J. COWAN, R.A.M.C.

I. THE PROBLEM

In the literature on venereal disease (V. D.), there is a tendency to confuse extra-marital intercourse with promiscuity. In this paper *extra-marital intercourse* is used in its literal sense to include all types of sexual relationships outside marriage, from semi-permanent liaisons—the mistress and some "girl friends"—to promiscuity in the strict sense. *Promiscuity* is here used to indicate the transient sexual relationship which ends after intercourse and includes, of course, relations on a commercial basis.

Although it may appear superfluous to emphasize the difference between sexual relations and the infection which may result, there is evidence that the prevention of exposure to risk (*prevention of extra-marital relations*) is not always clearly distinguished from *prevention of infection* by mechanical and chemical methods. The first of these two principles is psychological and social; the second is largely physiological and biochemical.

In the V. D. patients described below, it is obvious that the infection was usually the result of true promiscuity as defined above. It was much less frequently the result of other forms of extra-marital intercourse. This point should be borne in mind in reading this paper. It is for the moment irrelevant whether the apparent relative freedom from infection of the less transient affairs is merely the result of a lesser exposure to risk, or whether it arises from a complex of factors.

Widely differing views appear to be held as to the motivation of promiscuity in the soldier. It therefore seemed worth while to attempt to discover:

(a) whether the V. D. patients represent a random sample of the army population from the point of view of personality and outlook; or whether there is an excess of any particular psychological types.

(b) what motives lead to extra-marital intercourse, and to promiscuity in the strict sense; and

(c) what factors affect the use, or otherwise, of the methods commonly employed in the prevention of infection before and after exposure to risk.

II. MATERIAL AND PROCEDURE

(1) A random sample of 200 V. D. patients and a control of 86 impetigo patients were psychiatrically examined. In the V. D. patients, the only selecting principles were that cases of marital infection were excluded and that the men concerned were stationed in the United Kingdom.[1] Impetigo was chosen as a control group because the patients were accessible and because psychological factors, so far as is known, play no part in its etiology and epidemiology. The impetigo group was selected so as to be comparable with the V. D. group in age distribution, army service and location.

(2) The psychiatric interviews covered the life histories of the soldiers with special consideration of factors leading to promiscuity.

Each impetigo patient and each of 100 of the V. D. patients was seen for 1½ hours; the remainder for 40 minutes. Personality factors could be brought out in the "long" cases, which were not accessible by short interviews. Corresponding samples of V. D. and impetigo patients were examined in hospitals in London and the North of England. Between these two areas, certain relevant differences could be seen; but whatever effect these may have had on the incidence of venereal disease, there was no evidence that they had affected either the types of personality found in the V. D. patients or the precipitating circumstances of individual cases.

SUMMARY OF FINDINGS

(200 V. D. patients: control—86 impetigo patients)

A. *Infection*

	Per cent
First infection	86 *
Previous infection	14

* Includes infected at first intercourse—5 per cent.

B. *Source of Infection*

	Per cent	
"Picked-up girl	76	(152 cases)
Woman friend	18	
Prostitute	6	

Within the "Picked-up" girl group are included:

	Per cent
Specified married woman, husband away	22.5
Service girl	4.5
Man (homosexual act)	1

[1] Since these investigations were completed, information from overseas has shown that the situations leading to promiscuity in these areas do not radically differ from these here described.

C. *Place Where Infected Consort was "Picked Up"* (152 men)

	Per cent
Public house	55
Street	20
Dance Hall	14
Cinema	3
"Fun-Fairs"	3
Miscellaneous	5

D. *Personality Types*

Between the small control group of 86 impetigo patients and the 200 V. D. patients the following differences were found:

	Impetigo (86 men), per cent	V. D. (200 men), per cent
Immature personality types	19	59
Borderline types	19	30
Mature personality types	62	11

Note: These figures were obtained by what were clinical judgments. The findings of the control group are consistent with previous investigations in which the present and other observers employed similar methods in random or psychologically neutral groups of men. The statistical significance of the figures above supports the impression, widespread among specialists in the subject, that V. D. patients are not a random sample of the army population. Later sections of this paper attempt to identify the factors differentiating these patients.

Putting aside clinical psychiatric classifications, for the purpose of this paper it is convenient to describe the personality types found in excess among V. D. patients in terms of their aggressivity. The figures, and examples, are given below:

	V. D., per cent	Control, per cent
Unaggressive, dependent types (immature)	28	11
Over-aggressive types (immature)	31	8
Latent aggressive (borderline)	30	19
Controlled aggressive (mature)	11	62

EXAMPLES

These cases are condensations of the verbatim interview reports on which the patients were divided into the groups noted above. Precipitating factors in promiscuity are more fully considered elsewhere.

1. *Unaggressive Dependent Type*

B. C. Pioneer, Aged 30. He stated that he had always been a weakling. His mother had a job to rear him. Rather than play with other children, he stayed at home and lent a helping hand to his mother who often said he might as well have been a girl. He had never been able to hold his own. Fear of the hard ball prevented him from playing cricket, and fear of men prowling about prevented him from going out in the darkness.

Owing to ill health, he did not attend school regularly; he only reached Standard II. He worked in celanese works, afterwards silk-stretching. "It was not much of a job," he said.

He reported sick repeatedly with pain in the neck and foot trouble during the two and a half years of his service. He had been largely employed on fatigues. He believed that the Army had done him some good, but he would rather have been at home helping his mother. "When the other fellows go on leave, they go to their missus, I go to my mother. My mother is my girl."

After long protestations to the contrary, he admitted having been intimate with about 20 girls. "Aren't you going to do something tonight?", they said to him, whereupon he 'served' the girl.

He was accosted by a woman who offered him drinks. She then asked him to take her home and made advances to him on the way. He contracted syphilis.

2. *Over-Aggressive Type*

H. T. Rifleman, Aged 19. He was a baby-faced, innocent-looking and childlike person in appearance. He had been a delinquent from early childhood onwards. He was sent to an approved school, because of repeated larceny. Since he left school he had been six times to court for loitering with intent to commit a felony. He volunteered for the Army because the police came for him if there was any trouble in the district where he lived.

He seemed to be utterly undismayed by his acts of delinquency and was in fact rather proud of them. He stated that he was always cheerful. His temper was easily roused and, when he lost it, it was uncontrollable. Once he slung a curved blade and a pitchfork at a school-mate. He did not want to do it, but sometimes he felt he wanted to kill someone. He drank heavily and gambled.

He was shiftless in his occupation. He went A.W.O.L. to help his mother who had been accused of stealing. He was caught by the police when he broke into a jewellery shop and was under detention at the time of this report.

Since the age of 17½ he had had a fair number of girls. Three weeks before, coming out of a cinema, he picked up one and had intercourse. One week later, when he was examined for fitness for the Court Martial, gonorrhoea was discovered. He had not noticed it before.

3. *Latent Aggressive Type*

E. T. Pioneer, Aged 41. He was a man who had always been greatly over-attached to his mother. Until he was 30 he was a bookkeeper. He had been employed on clerical duties during the ten months of his service. He resented the discipline and restrictions of army life. "It's the last profession I would have chosen. I like to be kind to people," he said. He got a compassionate posting [2] near his mother.

[2] Posting to a unit near home on compassionate grounds. Example: owing to chronic incapacitating illness of mother.

He had always been unusually quiet, shy and reticent, had always worried over real or imaginary failings, and had always been over-conscientious in the approach to his duties. He disapproved of violence in any shape or form and would sooner have been shot himself than kill any of the enemy. He read a good deal. Books on the French Revolution were his favourite literature.

He had a nervous breakdown at 30. He complained of violent pains in the neck, on boarding busses had a feeling of being choked, and had fainting fits and various phobias.

Since the age of 20 he had had innumerable brief love affairs during which he never went very far. For the past three years he had been friendly with a girl, but he had postponed marriage in view of his obligations to his mother. He was greatly troubled by sexual phantasies which he felt, as a devout Roman Catholic, he should not have had.

At Christmas, rather worried about his mother's serious illness, he went into a public house and had some drinks. As he was unaccustomed to drinking, the few drinks soon took effect. He vaguely remembers that he got into conversation with a woman and that afterwards intercourse took place. He contracted gonorrhoea.

4. *Controlled Aggressive Type*

W. E. Sergeant, Aged 30. He had always wanted to follow in his father's footsteps and be a soldier. He served with the regular Army from 1930 to 1933. While on reserve he was a tram-conductor. He was recalled to the Colours after the outbreak of the War, and went to France. Since that time he had been a sergeant clerk. His unit had been stationed for 18 months at a very lonely spot; once a week N.C.O.s and men were taken on a recreational trip to the nearest town.

Although living conditions were very poor, he enjoyed army life and he intended to stay on in the Army after the war.

A month before, on one of their recreational trips, he went with some of his friends to a local pub. There he met a woman whose husband served in Ireland. Afterwards he escorted her home and had connection with her. He contracted gonorrhoea.

ALLIED CHARACTERISTICS

(a) *Test-Intelligence.* Distribution shows a slight bias towards the lower grades, insufficient to affect the general conclusions.

(b) *Drinking Habits.* When arbitrary standards were employed in the two groups, the following significant differences emerge:

	V. D. (200 men), per cent	Control group (86 men), per cent
Heavy drinker	29.5	2
Moderate drinker	68.0	91
Teetotaler	2.5	7
Admit intoxication at the time of infection	49	
Totally drunk	7	

(c) *Attitude Towards the Army.* Men were classed as "keen" when they spontaneously expressed enthusiasm for their army jobs in such detail as to be convincing to the interviewer, who was able to check his judgment by the verified army charges, or absence of them. Men were classed as "discontented" when they openly expressed a lack of interest, resentment, or maladaptation to army life, long antedating their illness. The "indifferent" group contained borderline cases.

	Keen, per cent	Indifferent, per cent	Discontented, per cent
V. D. (200 men)	17	28.5	54.5
Control (86 men)	48	23	29

(d) *Army Crime.*

	V. D. (200 men), per cent	Control (86 men), per cent
Percentage with moderate or serious army crime	20	8

The figures refer to men whose charges (verified from records) were more serious than a single entry for absence without leave, i.e., the charges concerned were, for example, repeated absence, insubordination, drunkenness, and civil offences such as burglary.

(e) *Marital Status.*

	V. D., per cent	Control, per cent
Married	52.5	46.5
Single	47.5	53.5

Both pairs of figures are similar to those for the Army as a whole.

(f) *Marital Infidelity.*

i. Out of 40 married men in the control group of 86, only one had been unfaithful, and that on a single occasion.

ii. Out of 105 married men in the V. D. group, in 52 there had been promiscuous acts before the act which led to V. D.

iii. In the remaining 53 of the 105 married men of the V. D. group, the infection occurred on the occasion of the first promiscuous act.

E. *Promiscuity*

i. Leaving out of account other forms of extra-marital intercourse, arbitrary standards were used to separate "habitual" and "occasional" promiscuity. The validity of these standards may be supported by the differences in personality between men of the two groups (see later).

ii. Cases of marital infection were excluded from this V. D. series.

iii. The small numbers of the control series must be emphasized. Length of Army service was, however, entirely comparable in the V. D. and control groups.

	No sexual experience, per cent	Married. No infidelity, per cent	Total non-promiscuous, per cent	Habitually promiscuous, per cent	Occasionally promiscuous, before army, per cent	Promiscuous since joining Army, per cent
V. D. (200 men)	0	0	0	38.5	29.5	32
Control (86 men)	20	43	63	4.5	16.5	16

In short, in the V. D. patients studied, roughly one-third were habitually promiscuous, one-third were occasionally promiscuous before army service, and one-third had become occasionally promiscuous since joining the army.

F. *Individual Precipitating Factors in Promiscuity.*

In an individual patient the factors noted were selected as outstanding by clinical evaluation of the man's statement. (See examples, below.)

	Per cent
Service maladaptation	58
Drunkenness	28
Home worries	22
Active seduction	2.5

Note: "Service maladaptation" includes marked dislike and incompetence for jobs, social isolation of unit, resentment of stern discipline, lack of social facilities, demotion, etc. 'Drunkenness" as a precipitating factor is not strictly comparable with the others listed. It includes, first, men who got drunk as a result of obvious worries which occur in the other categories listed above; and secondly, the recurrent or chronic alcoholic whose addiction is here assumed to have a psychiatric basis. Alcohol in excess could be seen to operate not only in preventing prophylaxis, before and after exposure, but also—and probably more important—in inducing a lack of discretion in the choice of consorts.

Promiscuity—and the selection of it as a mode of reaction to events—is certainly affected by the social situation of the individual. Unfortunately, it is not at present possible to publish figures of the incidence of V. D. by units, formations or areas. It is, however, permissible to say that in one set of figures examined, the incidence of V. D. in a field force division over a period of six months was some two-fifths that of the static unit troops of a neighbouring area. Clinical experience—and the importance of "browning off" [3] as seen in the case histories—supports this difference as likely to be confirmed by fuller enquiry.

Specialists in V. D., remarking colloquially that "it's the odds and sods who get it," confirm the finding of these studies—that true promiscuity leading to V. D. is as rare in the soldier with high morale as it is in the high morale unit, unless he, or it, has been badly shaken by events, or by abrupt changes of milieu.

[3] Colloquial expression implying resentful discontent with army conditions.

EXAMPLES

Case No. 1. Wife's Infidelity. An airman, aged 26, intelligent, conscientious, eager to get on in civilian life and in the Air Force, had always been unduly sensitive to wounds, real or imaginary, to his unusually high self-esteem.

He married six years before and was passionately fond of his wife, who gave birth to three children.

In May 1942, he came home unexpectedly on embarkation leave, and though it was after midnight, he did not find his wife at home. Alarmed and slightly suspicious, he searched for her in the streets, but there was no sign of her. When eventually she did come back, in the small hours of the morning, he detected on her frock unmistakable traces pointing to adultery, and accused her of it. After some reluctance she admitted it. He then, in a fit of temper, "smashed her." They made it up afterwards, but their relationship had never been the same since.

Before the incident, he had enjoyed male companionship; afterwards he looked for women's company—"somebody to confide in"—or else he preferred to be alone. Until then he had been faithful to his wife; afterwards he started a number of affairs with "picked-up" girls. Nineteen days before he had caught a syphilitic infection from a prostitute.

Case No. 2. Separation from Wife; Refusal of Compassionate Posting. A man, aged 29, had always been self-willed, stubborn, argumentative and self-righteous. If he did not get his own way, he flew into a violent temper. He came from a seafaring family and was very much upset when 2 years before he was called up for the Pioneer Corps, against his wishes. A year before he passed a cook's course and since that time he had been a cook attached to the Pioneer Corps. He was resentful about the war which deprived him of his comforts and peacetime pleasures, detested the Army, and, above all, suffered badly through the separation from his wife and family.

He had been happily married for nine years and, according to his account, he had always been faithful to his wife until this incident. His wife was a "bundle of nerves" and suffered from asthma. He applied for a compassionate transfer home, and as he was of a low medical category he had no doubt that his application would be granted.

When a month before he was informed that his application had been turned down, he was depressed and furious. He started to drink very heavily, did not care what happened, and had sexual connections with two

women, by one of whom—he did not know which—he contracted gonorrhoea.

Case No. 3. Discontented with Army Job. Physical Unfitness. A regular soldier of seven years' service, aged 25, a quiet, shy and serious man, dislocated his left shoulder in 1936, and had had relapses of this ever since. On return from France, owing to the recurrent dislocation of his arm, he was placed in "Category C" and posted from an infantry unit to a Convalescent Home. His job there was to make 50 bugle calls a day. Originally a keen and apparently efficient soldier, he now resented the monotony of his job and the forced inactivity on account of his disability. To keep himself busy, he helped in the cookhouse. All his pals had been sent overseas. He stood no chance of promotion.

As he was thoroughly "browned-off" he started drinking and was unfaithful to his wife for the first time. He contracted gonorrhoeic infection.

Case No. 4. Over-Severe Officer. A lance-bombardier, aged 31, serious in his approach to life and to his duties, deeply religious, a man of strict moral views, had been happily married for ten years prior to the following incident.

He joined the army eighteen months before and got on very well until thirteen months after an officer, who was a slave-driver, was posted to his unit. "It was a life of hell" the patient said, "he held us on lectures until 7:30 every night. We were not getting any Saturday afternoon or Sunday off. He had no understanding for the men and if he had, he did not care. He was not a gentleman, he was a brute." The patient lived in constant dread of this officer. He had had a clean record so far and did not want to get into trouble. 'The few nights I could get off, I went out, just to cheer me up." Nine weeks before, in a mood of deep despair, he became friendly with a nurse, "a girl of a religious nature. I told her all my feelings and she sympathized with me. I felt absolutely browned-off. I wanted somebody to confide in." Three weeks before this report he was intimate with her for the first time and became infected with gonorrhoea.

Case No. 5. Embarkation. A driver, aged 29, quiet, shy, retiring, unaggressive and timid, joined the Army 2½ years before. He loathed army restrictions, preferred his civilian job to his army job, and, in general, resented the uncertainty of being constantly shifted about. He abhorred fighting, would have liked to get out of it altogether, and had always been frightened of being sent overseas. He longed for security and a settled existence and would like to have married at the earliest opportunity.

For the last six years he had been going with a girl and for the last three years he had been intimate with her. She asked him to postpone marriage until after the war. He had not been intimate with any other woman. Three weeks before he was sent home on embarkation leave. His mother was very much disturbed by the idea of his going overseas. A few days after his return to the embarkation depot, feeling tense and anxious, he went with a pal into a local low class "pub" and picked up a woman from whom he contracted gonorrhoea.

Case No. 6. Detention. A regular soldier, aged 20, keen but very hasty-tempered, was transferred to the Commandos. He enjoyed the service at his unit, but did not get on with his corporal. One day, on invasion exercises, the patient had to jump into water and afterwards to march some distance carrying an anti-tank rifle. As he was completely drenched he did not march fast enough and did not keep pace with the others. The corporal made repeated sarcastic remarks about this. Eventually the patient lost his temper and used obscene language; whereupon he was placed on 27 days detention and transferred from the Commandos to an infantry unit. This was a very severe blow to his pride. When he came out of detention he got himself drunk, and in a "pub" picked up a woman from whom he caught gonorrhoea.

G. Prophylaxis

(i) "Adequate" measures indicate use of condom and/or "Early Treatment" (E.T.). "Inadequate" means washing genitals and/or flushing urethra with urine.

(ii) Of the 86 men of the control group only the 4 who were habitually, and the 28 who were occasionally promiscuous are available for comparison.

	V. D.		Control	
	(200 men)	Percentage	Percentage	(32 men)
Adequate	19	9.5	72	23
Inadequate	44	22.0	3	1
None	137	68.5	25	8

Attitude Towards Condoms. In the 200 men with V. D., 137 (68.5%) had not employed condoms on occasion of infection. The reasons given are listed below:

	Per cent
Condom regarded as unnecessary	56
("Consort was mistress"; "Looked respectable"; "She was well-educated"; "She had a horror of V. D."; "She said she was clean"; "Other men in the unit had been with her and were all right"; "I've always been lucky"; "I'd been with her before.")	
Condom rejected because of pleasure-impairing effects	17
Condom not available	10
Condom not used because of drunkenness	13
Condoms regarded as contraceptive, not prophylactic	2
No proper connection took place	2

Habitual Promiscuity and Prophylaxis of V. D. by Condom.

i. In the 286 men of the V. D. and control groups there were 77 arbitrarily defined as "habitually promiscuous," for the following periods:

Over 7 years	27
1 to 7 years	49
Less than 1 year	1

ii. Of these 77 men:

	Per cent
24 had never used a condom	31
12 had always used a condom	16
41 had used a condom selectively	53

iii. In the three groups mentioned in the last paragraph no gross differences could be found in the distribution of the times which elapsed before infection occurred.

The Good or Bad Soldier. The investigations under discussion were, of course, made in England; but they can hardly fail to have some general relevance.

In the present sample, the habitually promiscuous were to a large extent poor bargains from the Army's point of view. Immature in personality and incapable of adequate loyalty, they were unlikely ever to become efficient soldiers. On the other hand, among the V. D. patients there were some men of high personal morale and efficiency, and it is to be presumed that such men exist among V. D. patients abroad. In most cases these men were of relatively mature personality, and the situations or events which had led to promiscuity were proportionally severe. (See below.)

It is, in fact, a point of some importance that in men who could be classed as good soldiers, the circumstances which had led to promiscuity would certainly have produced severe emotional disturbance in most people. In some keen and efficient soldiers even strong religious beliefs proved no deterrent, much less ill-remembered lectures however frightening, salacious or efficient they may have been. To regard promiscuity primarily as a sexual problem, therefore, is not only inaccurate; it ensures that prophylaxis will be aimed at a wrong target.

H. *Motivation of Sexual Activity*

No doubt as a result of the emotional background of the subject, ignorance of the facts about human sexual behaviour is not confined to those who are reputed to have been kept in this state by a stern domestic or community attitude towards discussion of these matters. However this may be, the theories of the psychological aspects of sexual activity in the human as they emerge in the literature and in discussions are strangely inconsistent and seldom cover more than a few of the known facts. For example, it is not uncommon to come across the assumption that some simple physiological necessity, obscurely glandular, drives men to sex relations. As an explanation of habitual promiscuity a theory of this type carries as little scientific justification as the explanation of the chronic drunkard that the need for fluids is the compulsion behind his excesses. It is worth noting, however, that the cynicism which meets an explanation of this type when it is put forward by the drunkard does not appear to be applied to the chronically promiscuous.

Experience has shown that the wide range of human erotic and sexual interests cannot so far be explained in terms of simple and specific physiological needs. For practical purposes, a psychological approach enables us to differentiate the very different types of need and motive which may lie behind very varied or even very similar human sexual activities and behaviour.

Psychodynamic Factors Underlying Promiscuity. Habitual promiscuity is obviously related to incapacity for deep attachment to any one woman, or to a deficient amalgamation of feelings of affection and sexuality. It originates from a disorder in the emotional development of the individual.

The conflict underlying habitual promiscuity arises at a very early stage of instinctual development, and is reactivated and reinforced when the child, passing out of the phase of complete self-centredness, tries to establish a reciprocal relationship to his father and his mother. The individual, who later becomes habitually promiscuous, carries into adult life an excessive load of self-love; in addition, he retains towards his mother an anxious and undue attachment, together with a certain resentment; while towards his father he shows an ill-concealed, or even outspoken hostility. Many promiscuous individuals reject the idea of marriage because, as they say, they prefer their mother's company to that of any other woman; and if they marry, they often only do so after their mother's death.

Habitually promiscuous individuals never reach full sexual maturity; each of their numerous sexual affairs has a playful character and resembles masturbatory gratification more than a mature union; the multiplicity of their affairs points to a search for the unobtainable.

In other words, habitual promiscuity is a reactive phenomenon related to frustration early in life. In their phantasy lives, the habitually promiscuous feel themselves deprived of, and deceived about, what they regarded as their due. Their promiscuity is a compulsive-repetitive expression of their demands.

In relation to women, they may, if an optimistic note prevails, continue into adult life a childlike craving for love and affection (dependent type above), or, if elements of vindictiveness predominate, they may despise women and display only a faint resemblance, or even a complete absence of true affection. (Aggressive type, above.) But even in those who apparently resign themselves to the fact that their out-of-date needs will never be gratified, there is still traceable an element of resentment, which is one of the driving forces behind the endless series of their unsatisfying sex affairs. Difficulties arising from this conflict also

account for the split between affection and sexuality so commonly found in promiscuous individuals. Without recognising the fact, they differentiate between the much coveted but unobtainable maternal figure and the despised but easily accessible woman of easy virtue. This uneasy relationship to women drives them into male companionship; but latent repugnance for what is—for them—a homosexual relationship strongly reinforces their drive to promiscuity.

Similarly, in these people, rebellion against their stern and pleasure-denying fathers, whether real or imagined, makes for a disproportionate reaction against disciplinary measures. Army life thus revives, on two separate counts, the ancient conflicts of these individuals. They react badly to separation from mother or wife to the discomforts and deprivations; and secondly they resent unduly the strictness of their superiors. Flight from such conditions and search for a homely atmosphere drives some of them into public houses and into the arms of the woman friend who may be infected. With others, suppressed resentment finds its outlet in repeated sexual acts with "pick-ups." Intercourse in such cases is fundamentally an aggressive act, devoid of feelings of affection. As colloquial speech so clearly testifies, the aggressiveness and resentment originally directed towards a much hated superior, vent themselves on an unloved inferior. Thus sexual activity is used as a safety valve for pent-up tension, anxiety and hatred.

The psychodynamics of promiscuous episodes in occasionally promiscuous individuals do not fundamentally differ from those outlined above. In otherwise mature individuals, such episodes represent a temporary slipping back into an earlier phase of instinctual development under the force of circumstances.

I. *The Soldiers' Welfare*

It has been shown that promiscuity occurs in a certain group of men who react abnormally to circumstances which, however widespread in time of war, are to them unusually frustrating. Army life with its inevitable changes intensifies pr -existent drives towards promiscuity, or may activate such drives in those who are predisposed in this direction. From this it follows that successful man-management, and other measures mentioned below, can reduce the incidence of V. D. by lowering the emotional tensions which lead to it.

It may be said that the incidence of V. D. is not sufficiently high to justify any organizational or administrative action. It would be necessary to admit this judgment, were it not that V. D. is only one of the sources of military inefficiency related to low unit morale. The most obvious of the allied phenomena are absence without leave and drunkenness. This group of problems cannot be dismissed as unimportant, and it is therefore possible to justify the suggestions made below on the ground that they would certainly pay a high dividend in military efficiency.

J. *Welfare and Recreational Facilities*

It is a truism that personal worries can most easily be handled by free discussion with someone who is understanding, rather than sympathetic. In the specific instance of the promiscuous soldier, the problems concerned are so personal that it is not easy for him to discuss them with his Platoon or Company Officer, even if, in the large static units which exist in this country, these officers were able to give time to the problems of the disproportionately large number of men under their Command. Similar difficulties exist with regard to the medical officer, whose ordinary clinical duties take up nearly all of his time. The soldier apparently feels, rightly or wrongly, that Chaplains are likely to take up a moral or critical approach towards his problems, while the Welfare Officer is usually too inaccessible in the acute instances where immediate ventilation of the problem would lead to favourable results.

In these circumstances, the best results would probably be obtained by providing a certain type of homely atmosphere in the canteens and clubs which are run for the soldier. This has little or nothing to do with the buildings or the facilities, and is mainly a question of finding the right type of staff.

Although it is realised that this problem is much less simple than it might appear, there is good reason to believe that this cheerful and homey atmosphere is of fundamental importance in providing types of recreational facilities which are likely to produce satisfactory dividends in the morale field, and to compete successfully with the non-military influences of the "pub." Evidence from the case histories shows how much help these promiscuous and potentially delinquent soldiers can obtain by ventilation of their problems. In the case of the female staff of clubs and canteens, not all types of women are likely to be equally successful in these fields. The women required need to be sisterly or maternal, rather than matriarchal, in their attitude towards the men, and should invite confidences rather than prevent them through differences of accent, outlook and social background. The provision of welfare facilities of this type, and of a suitable staff for the purpose, appears to have been undertaken with obvious success by the U. S. Army.

K. *Practical Conclusions*

i. The incidence of the habitually promiscuous (38.5) is probably too large to make a practical

proposition of segregation or detection, which would probably need a specialist interview.

ii. An order or a threat that re-infection would lead to penal segregation would encourage concealment.

iii. Men who were occasionally promiscuous in the strict sense made up nearly two-thirds of the V. D. patients. The external events which usually lead to such acts are not of a nature which can be controlled from within the Army. Nevertheless, the acute emotional disturbance which prompts promiscuity in these men could in many cases be reduced below the danger point by effective man-management or by the provision of a certain type of recreational atmosphere which could, on this important occasion, compete with what is felt to be the warmth and geniality of the "pub."

iv. The nature and motives of the completely promiscuous, non-professional consort seem to represent a field of investigation which might yield a profit. The problem of such women is not likely to be solved by education. As in the case of the habitually promiscuous man, it is likely to be based on personality and such facts as being unaware of infection.

v. Since promiscuity of the types which lead to V. D. is seldom the result of positive mature sexual interest but mainly the result of attempts to relieve acute psychological stress, neither punishment on the one hand nor evil counsel on the other is likely to affect to any marked degree the incidence of such promiscuity.

vi. More precisely, increased propaganda favouring prophylaxis of infection by condom and by chemical methods is unlikely to increase the promiscuity which leads to V. D.

vii. Propaganda and education with regard to V. D. should primarily take into account three important points:

(a) Physiological need—"the human nature" theory —does not exist in true promiscuity.

(b) True promiscuity has an acute or chronic neurotic motivation. There is not the slightest evidence for the view which attractively links up health, virility and promiscuity.

(c) Promiscuity, like drunkenness and absenteeism, is a matter of morale rather than of morals. Ethical judgment of neurotic problems has not proved helpful in the past.

The circumstances which lead to true promiscuity are such that full-blooded propaganda on the *prophylaxis of infection* by mechanical and chemical methods is unlikely to increase the promiscuity which leads to V. D.

viii. The only actions likely to lower the incidence of such promiscuity are wide general measures to deal with the group of morale problems which also lead to military inefficiency, recurrent absence and drunkenness. Outstanding among such actions is the provision of recreational facilities in which a homey atmosphere is provided by a staff with whom acute personal difficulties can be discussed without undue embarrassment.

ix. The morale situation—and the provision of prophylactic facilities—in the case of men on leave and in embarkation depots or transit camps, warrant special attention, since in these circumstances men tend to be infected who are more valuable soldiers than the average run of V. D. patients.

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URINARY CONTROL AND ENURESIS

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I. INTRODUCTION

The psychopathological literature includes many publications on enuresis as a problem. There are, however, no studies available on systematic observations of young normal children which would permit the establishment of scales of development as related to urinary control and deviations from the normal. It is generally admitted that training for the control of urination varies greatly from one type of culture to another but specific information is usually lacking. It is planned in this publication to investigate the records of children admitted to the Payne Whitney Nursery School from 1937 to 1943, six complete years; to analyze the data in order to ascertain under what con-

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ditions and by what methods bladder control is established, which children show resistances, which children comply readily, which children have relapses in their training; and to analyze the psychodynamic factors involved in the many variations.

II. METHOD OF RESEARCH

The Payne Whitney Nursery School since 1937 has admitted normal children, from 2 to 5 years of age, coming from families of fairly homogeneous social and cultural backgrounds as previously reported (3). Normal behavior is defined by the criteria of social behavior and negative history of mental illness in the child or his parents. Only children of normal or superior intelligence as ascertained through their previous behavior and development are eligible. Preference is given to children who have had siblings in the nursery school.

Shortly after the child's admission a dynamic history is obtained along the lines of a full psychiatric history. Investigation of the child's family brings out personality characteristics and the role in the family of the paternal and maternal grandparents, the father, mother, siblings and all other people who have been in contact with the child in his early years. The personal history covers the circumstances of pregnancy, birth and early developmental facts: feeding, motor development, speech, teething, growth, sleep, diseases, convulsions, injuries and operations, elimination training, emotional attitudes and reactions, group relationship, group emotional reactions, activity, religion and ethical training, attitude toward one's own body, infantile and so-called neurotic traits.

Daily behavior records are compiled with notations on mood, activity, social reactions, special mannerisms, rest, eating, excretion, speech, anxiety, aggressiveness, attitude toward one's own body, motor coordination, etc. Daily reports from home are also included. Lastly, complete mechanical recordings of play sessions with the psychiatrist (4) are entered in the records so that the child's total behavior can at any moment be known.

Under the circumstances it was a simple matter to investigate the problem of urinary control and enuresis through the information collected in the anamnesis, daily records and records of play sessions.

III. GENERAL FINDINGS RELATED TO THE ACHIEVEMENT OF URINARY CONTROL

Of the 74 children admitted in the years 1937 to 1943 there were 60 whose records were considered complete from the point of view of time at which control was achieved for day and night. There were 31 boys and 29 girls, in line with the policy of the school to have the sexes divided about equally. Bladder training was achieved:

a. for daytime

Under 1 year		1 to 1½ years		1½ to 2 years		2 to 3 years		3 years and over	
Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
2	1	8	9	8	8	9	10	4	1
3		17		16		19		5	

b. for night

Under 1 year		1 to 1½ years		1½ to 2 years		2 to 3 years		3 years and over	
Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
2	1	4	6	1	7	12	14	10	4
3		10		8		26		14	

It can be seen that the majority of the children achieved bladder control during the period of from 1 to 3 years (33 in the period 1-2 years, 35 in the period 1½-3 years). Bladder control was achieved for night in the period 2-3 years (27 children) with a greater lag into the period of 3 years and over than was the case with bladder control for day.

Regarding the period at which training for bladder control began, data are not complete, and in the records of only 35 children could the information be considered specific and adequate enough to be included.

Before 3 months		3 to 6 months		6 to 12 months		1 to 1½ years		1½ years +		No training	
Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
0	0	2	2	4	5	5	6	6	1	2	2
0		4		9		11		7		4	

Computing the average time for bladder control (day) for the 60 children with complete records, the figure *21.4 months* is obtained. For bladder control (night) of the same 60 children, the computed average is *27.28*

months. For the 35 children with complete specific information about the age at which training began, the computed average is *12.8 months.*

From these figures it appears that bladder control is achieved rather late in this cultural group, when compared with figures found in the literature. Statistics in the literature are concerned with enuresis rather than achievement of normal control, and it is planned to analyze the records of the children in this series who are considered enuretic.

IV. METHODS OF TRAINING

From the general point of view of training, it is interesting to examine the various methods used by parents or nurses to achieve control.

As can be seen from the tables, four children were initiated into training in the period from *3 to 6 months:* Boy #50 at 4 months; Girl #51 at approximately 5 months; Boy #63 at 5 months; Girl #64 at 6 months. Control was achieved in the case of these four children respectively as follows: Boy #50, day, at 2 years; night, 2 years; no relapse (child observed to 5 years 2 months). Girl #51, day, at approximately 21 months; night, 18 months to 2 years; there was a relapse at 2½ years, also coincident resistance at bedtime shortly after the parents' divorce (child observed to 5 years 2 months). Boy #63, day, at 9 months; night, 9 months; no relapse (child observed to 4 years 6 months). Girl #64, day, at 12 months; night, 12 months; no relapse (child observed to 5 years 6 months). As a group these four early-initiated children achieved control relatively early, but not uniformly so.

At the other extreme, *four children were not trained,* these children eventually establishing their own habits of cleanliness. The mothers reported: Girl #28, "No attempt at training. . . ." Boy #29, "No systematic training. . . ." Boy #38, "Never was trained. . . ." Girl #54, "No system of training. . . ." In these four cases training was achieved respectively at the following ages: Girl #28, day, 18 months; night, 18 months with occasional accidents; no relapse (child observed to 3 years 5 months). Boy #29, day, 19 months; night, not fully trained at 3 years 2 months, was practically clean at 2 years, but had a relapse (both bladder and bowel) coincident with brother's birth at 2 years 2 months (child observed to 3 years 2 months). Boy #38, day, 23 months; night, shortly after 23 months; no relapse (child observed to 4 years 6 months). Girl #49, day, 2 years 11 months; night, 2 years 9 months; no relapse (child observed to 4 years 3 months). The date of control achievement for these four children is also relatively late.

Not only do the records show great variations in dates of initiation and achievement of training but also, and perhaps more significantly, in the *methods used for training.* In the first place, only a relatively small number of children were trained exclusively by one person, either the mother or the nurse.

The most generally used method was to put the child on a pot or a toidy seat at regular intervals varying from ten minutes to one hour. The potty allows closer contact with and support of the child, even when on the floor, since it is more accessible. In several instances the mother or nurse held the child on her lap in a secure position rather than put the pot on the floor. This was by far the most successful method, and there are two main reasons for this: it gives the child physical support and the reassurance of the mother's close presence; but it is also obvious from an analysis of these mothers' records that they chose the method because of their close relation to the child and absence of distaste for the procedure, both of which concurred to create a satisfactory emotional atmosphere and excluded tensions from the training situation. Under such conditions training was achieved more easily with less resistance on the part of the child, and there was no tendency to relapse, provided training had not been attempted earlier than neuromuscular maturation would permit. An illustrative example is that of Girl #22. The mother was in charge of her two children's training and was intimately connected with their activities, leaving only a minor part to the maids. She was a well adjusted, effectual and secure individual who throughout seemed to have hesitated very little about her aims in the bringing up of her children. At 1 year the mother began putting the child on a pot on her lap every ten minutes, holding her closely, gradually lengthening the intervals in terms of her observation of performance, so that the child was trained in about one month and never had a relapse. The mother's own attitude in regard to elimination played a part in this and other cases and will be further discussed under this heading.

In the case of one child a singular procedure was used for both bowel and bladder training, "based on a conditioned reflex method": The child was "trained like a puppy, a travelling toidy was placed at the spot where she had previously messed." No exact time was given, but the child was trained in about a week, some time after she was able to walk alone (9 months). There was no relapse.

In a large number of cases, attempts were made by the mother or nurse to observe the "rhythm" of the child and "catch him" before the probable voiding time. As a rule, this did not bring any satisfactory result, since the observations were made during a period of infancy when the retention span was too

short to allow adequate observation. In one case (Boy #7) where long voiding intervals were observed, it was possible to obtain early bladder control in the daytime (13 months) but the child was still wetting the bed at 3 years 6 months. Usually the person in charge of training gave up observations after a short while.

One mother waited until the child was 11 months, then she kept a chronological record of intake and output for one week before starting training. The child showed so much resistance to her mother that the latter turned the child over to the maid. This child further protested by refusing to use the potty, then accepted the toidy seat. Training was achieved during the day at 2 years, but at 4½ years there still was occasional bed wetting.

The methods used for training have a significance not only as they determine the probable course of the training itself and the attitudes (compliance, resistance, etc.) of the child toward it, but also they are a reflection of the mother's directness of purpose or lack of it, her own adjustment, her feeling of security or insecurity in relation to her own child. Conscious and unconscious motives come into play to determine the particular method adopted by the mother.

It was difficult to obtain reliable information regarding *the parents' own early training* since in most cases the grandparents were not available, and memories of early childhood were often lacking or distorted. However, in several cases the mother established a definite relation between her approach to her children's training and her reactions to her own early habits. The information in the case of six children was currently substantiated or formulated by the maternal grandmother. Girl #9, for instance, still enuretic (day and night) at 4 years 2 months, was trained "too early" (a few months, exact date not recalled). The mother reported that as a result the child "hated the sight of a bathroom." There were alternating periods of control and relapse, with tendency to dryness, when at 3 years, coincident with the birth of a sibling, she had a complete regression (bladder and bowel). The mother was unhappy and confused about the situation. She attempted to explain her indecision in the matter of early training as "having read so much psychology," but also stated that she was sure the whole matter would clear up at 12 years, the time at which she herself had become dry; she could not understand why she fussed so much about her child's training anyway. She talked at length about her own feeling of anger when she was put to bed for wetting her pants, and the wet clothing was hung over her bed so she "could see it all the time." The mother referred several times to the child's having "a weak bladder like me and my mother." Her confusion was further increased by the multiplicity of approaches and treatments suggested by pediatricians, the last of which consisted of giving in increasingly large doses tincture of belladonna (up to 25 drops) three times a day, with no result. A statement from the maternal grandmother of Boy #71 establishes a similar familial pattern, but with different results. The grandmother stated that all her children had been slow in developing habit training, which had not prevented them from being "all wonderful children" (referring to later brilliant accomplishments). Boy #71, whose training was started at 8 or 9 months, was dry at 14 months, for day, and at 26 months, for night, with no relapse. The mother left training to a nurse, fully in charge. There was satisfaction and continuity in the child's relation to the nurse. The mother of Girl #22 and Boy #23 recalled the strictness of her own parents. She had suffered frequently at the thought of not being able to go to school if she could not move her bowels, a rule established by her mother. The maternal grandmother had been unyielding about early training and "had gotten results."

Another finding brought out by the analysis of the total anamnestic data is that *infants seemed to react to being wet in widely different ways.* While no systematic attempt was made to secure this information in the course of history taking, spontaneous statements made by some mothers were illuminating. There were 15 children in whose records were found comments that the infant very early disliked being wet. All except one were among the children trained early, and the average time at which bladder control was achieved in this group was *14 1/2 months* for day, and *18 3/10 months* for night, which is significantly lower than the averages computed for the total number. There were 7 boys and 7 girls in this selected group. When further investigated this "dislike" was found to be expressed by screaming, squirming and a facial expression akin to grimacing. Whether the "dislike" was a true difference between infants or represented a greater awareness of the infant's variations in behavior obviously could not be checked. It was of interest to check on the possibility of a constitutional factor, or some neuromotor characteristics which might explain this finding.

Birth-weight, condition at birth, feeding, growth and motor development were therefore compared with similar headings in the records of 28 other children. The average birth-weight of these children was found to be somewhat higher than that of the control group (8.22 lbs. as against 7.78 lbs.). They were sturdy and active babies; except one, they ate well; their psychomotor development was relatively early, as judged

by the ages at which they sat up and walked alone. The developmental facts related to birth-weight, condition at birth, feeding, growth and motor development, all point to a level of maturation which may be higher for these children, and probably involves a concomitant higher neurological maturation, reflected in more easily attained sphincter control. Furthermore, the fact that they were active children, though not necessarily restless sleepers, may have a bearing on their more intense reaction to being wet, since greater activity would increase the discomfort of moisture by lowering the temperature, while a relatively inactive infant would be more likely to maintain body temperature. This may have been a factor in facilitating training. However, the mother's attitude, once more, is not without playing a part. This is brought out conspicuously in the statement of a mother whose boy was bladder trained for day and night at 9 months, without relapse (one of the two earliest trained children). The mother reported that the baby "screamed when he was wet; *it drove him crazy.*" The mother was enthusiastic about "the drastic methods of training used by English baby nurses," and in particular the boy's own nurse who started bladder training at about 5 months, and bowel training at birth (achieved in one week). This child, incidentally, was rigidly trained in other areas than elimination, and this rigidity had a bearing on his later difficult adjustment.

V. FINDINGS RELATING TO ENURETIC CHILDREN

In this publication an enuretic child is arbitrarily defined as a child who has not achieved bladder control for day at 2½ years and for night at 3 years. In this evaluation only regular accidents (five a month, or more) are included, but not rare or occasional accidents associated with unusual stresses. It is also taken for granted that cases of urinary incontinence due to organic causes are not included.

By such standards it is found that 14 children (10 boys, 4 girls) can be considered enuretics, from a total of the 60 children with full data, a percentage of 23½, higher than figures given in the reports found in the general literature but similar to them in that boys predominate. Training for bladder control as a rule was initiated late, except for one child (Girl #9 referred to above). On three children specific data were not available, two children were not systematically trained, and for the remaining eight children training was initiated at ages varying between 10 and 24 months.

The *psychomotor development* of the 14 children considered to be enuretics was further investigated. Birth-weight in these children cannot be considered significant. The lowest weight was 6 lbs. 13 oz.; the highest weight, 9 lbs. 2½ oz.; so the average birth-weight of 7.64 lbs. compared well with the average birth-weight of 7.78 lbs. in 28 non-enuretic children of the Payne Whitney Nursery School. Early feeding did not present any anomaly. All these children were reported to have been good eaters since infancy ("nursed vigorously . . . best nurser in the hospital . . . loved nursing," etc., were frequent comments). All except three had tripled their birth-weight at 1 year, and these were very close to standard. The fact that the breast-feeding period was either very short or nil is not remarkable, since it is also found in the total group. One fact stands out; namely, that these children fed and gained well.

Sitting and walking were comparatively late, since only four children sat up under 6 months, and ten at 6 months or over (earliest 4 months, latest 14 months), while three walked under 13 months and eleven at 13 months or over (earliest 9 months, latest 26 months). In the control group of 28 children, the computed average for sitting up was 6 months, and for walking, 13 months. At this point it should be emphasized that the 14 children, like all children at Payne Whitney Nursery School, were of normal or superior intelligence (lowest I.Q. 100, highest 164, average for the 14 children 132).

Observations on *sleeping* indicate that these children as babies were predominantly quiet. The reports for all, except one where specific information is lacking, read "good baby . . . never fretful . . . slept well . . . always slept well," over and over.

Thumb sucking was present in all these children, early, and through the period of observation at Payne Whitney Nursery School in varying degrees of intensity and frequency; several also showed other infantile habits—such as nose picking, biting, teeth grinding, ear rubbing, rocking, genital handling—for periods longer than usually noted in young children; and two boys showed a tendency toward stuttering, more marked than the so-called developmental stutter would explain. The infantile habits as outlined here show a relatively high frequency in this group of children, and this is in keeping with numerous reports in the literature on enuretic children.

The social behavior of these children presents characteristics which deserve special consideration and analysis. Before proceeding with this analysis, it is recalled that aggression and drive for self-assertion arise early in the young child, and that aggression is an essential requirement of his early emotional and social adjustment. While it is not possible to assign a quantitative value to the amount of aggression which can be defined as normal, the system of daily behavior records used at Payne Whitney Nursery School makes possible a rough classification into normally-aggressive, under- or over-aggressive behavior. With this in mind,

it is at once obvious that *the enuretic children have difficulty in giving an outward expression to their aggressive impulses.* Comments taken from the records are highly illuminating. Girl #9 "lacks aggressiveness . . . play is solitary . . . child apprehensive . . . very passive . . . a doglike acceptance of other childrens' ideas or teachers' suggestions . . . aggressive only toward her doll and carriage . . . no tantrums." Girl #15 has "no satisfactory play with others . . . apprehensive . . . seldom expresses aggression . . . no tantrums but sudden outbursts of hostility and negativism." Boy #45 is "self-conscious . . . fearful . . . cries at nap . . . no tantrums." Boy #46 is "rarely angry . . . runs crying to teacher . . . no tantrums." Boy #58 has "fears . . . apprehensive of any physical expression on the part of another child . . . no tantrums." Boy #59 is "not aggressive . . . has nightmares during which he screams 'Don't do that! . . . I don't want to' . . . has severe temper tantrums."

Three boys in this group were reported to have *temper tantrums* and *nightmares* (Boy #21, Boy #59, Boy #74). Aggression normally expressed by other children in their social behavior was suppressed, or under control, and, at times of accumulated tension, broke through in the form of tantrums. Tantrums in young children are not always indicative of aggressive expression, and probably in the majority of cases are in the nature of anxiety attacks; but in the case of these three children there is no question of their being precipitated by resentment and aggressive impulses. The associated irritability and sudden outbursts of anger are added evidence found in the records. Nightmares can be interpreted in the same light, despite the diversity of content. Boy #21 dreamt of punishment meted out as an outcome of bed wetting, and phantasies of the same type were expressed in free play. Boy #59 had frequent nightmares in which he loudly protested against discipline; stubborn resistance was reported at home. There were aggressive phantasies noted in free play sessions. Boy #74, who ground his teeth and had night terrors (content unknown), had severe temper tantrums almost daily at school, generally in connection with simple routines and acceptance of group activities. In the case of the last child, solitary play, with very rare participation with others, was an almost daily observation.

The analysis of the phantasy life of these children as expressed in the individual play sessions bears out the statement made above; namely, that they had difficulty in being normally aggressive when in contact with other children. The records of three boys and three girls in the group of the 14 enuretic children are briefly summarized for the purpose of illustration:

Girl #9 (3 years 7 months to 4 years 2 months), I.Q. 112, older of two children, was shy, apprehensive, spent considerable time daydreaming and sucking her thumb, played out the following phantasies: The mother got pneumonia and died, the baby was sick most of the time, also thrown away, slapped, spanked, killed by a fire engine. She often identified with her baby sister (three years younger than herself), said she wanted to be a baby again. Anxiety was expressed about men and animals biting, as well as sadistic (biting) phantasies. Many of this child's drawings represented members of the family with prominent mouths, and frequently "two mouths," one of which was larger than the head, and the other ventrally situated. *Peemer* and *Peemin*, terms which refer to urination, and similar epithets recurred frequently to designate the baby, and the child, either as herself or the baby, was liberally punished. Trends manifested in the play were, therefore, hostility toward mother and baby, sadistic phantasies (oral component was prominent), death wish, self-punishment and anxiety, in order of frequency and/or intensity.

Girl #15 (3 years 0 months to 3 years 7 months), I.Q. 145, an only child, in the play sessions made numerous drawings of a little girl to whom she gave her own name, or a dog, or an alligator, all of whom had very prominent teeth with which to bite, and their mouths open so they could put their fingers in them. When she played with the dolls, the girl (with her own name) was slapped by the mother, the girl's head had to be turned around "because she talked too much," the father was "selfish" and "an old grouch," the father and mother were handled roughly, they were spanked because they had wet their clothes, and the nurse was disposed of by being lost in the woods. In the play, she identified with "the little girl," got angry if the observer neglected to call the doll by the child's name, also with the biting alligator about which she dictated: "another S for alligator and S—" (her own name).

Girl #20 (2 years 10 months to 4 years 5 months), I.Q. 129, 144, 130, then the older of two children, had a rich phantasy life in which were prominent the hostility and death wish toward a sister 3½ years younger than herself, many phantasies of punishment (being thrown into the river, for instance) because she had wet her pyjamas. The punishment was given out by both the father and the mother. The river played an important role in her phantasies, and there was in particular a phantasy of the younger sister falling in the river, being frozen in a large block of ice, going down the sewer and reappearing at a later time. As in the case of Girl #9 (also of Girl #15 but to a milder degree), the social contact was markedly impaired by thumb sucking and the phantasies associated with it. In this case many interviews were had with both parents, especially the mother, but space does not allow for discussion of therapeutic method and results.

Boy #21 (3 years 7 months to 5 years 2 months), I.Q. 96, 100, the younger of two children, showed an all-absorbing, almost obsessive concern with urination and associated phantasies in his free play. In play repeatedly the boy wet the bed and was punished for it. He introduced a toy cat or dog and commanded, "Make pee-pee on him" (usually the father, sometimes the boy; never the mother or the

brother). The parents punished the boy, shouted at him, "I don't want a pee-pee boy!" and sent him away. The child hid the boy (himself) in the most inaccessible places he could find, back of screen, radiator, etc. The rejection as a means of punishment was so vividly expressed, and with such intensity of feeling, that the observer became convinced that some actual traumatic experience was related to the phantasy, and she requested an interview with the mother shortly after the first play sessions. The mother recalled an early event of considerable significance, which she had blocked when she gave the anamnestic data. When the child was 2 years old, and bowel- and almost bladder-trained, the parents had left him and his brother at a boarding home during a business trip which caused them temporarily to break their home. They were informed later that the children were unhappy and badly treated, and they decided to take the older boy away, leaving his brother there "since he was so young," implying that because of his age he could not be affected by the environment. It was learned that when the parents finally took him back, several months later, he had regressed considerably in his speech and habit training (wet and soiled freely). The mother had repressed the whole experience; and it was as an outcome of her interview with the physician, when she qualified the information given her as "a revelation," that the early event was brought back. Incidentally, spanking had been used throughout, since the age of 2, in connection with wetting—a rare occurrence in children of this cultural group. Several interviews with the mother followed, when the parents' and grandparents' attitudes were discussed and guidance offered, with good results.

Boy #58 (2 years 10 months to 4 years 5 months), I.Q. 164, an only child, in his free play expressed hostility toward the parents and rebellion against their discipline. "He (boy) doesn't like his mummy . . . he doesn't like his daddy either . . . because he's a big boy . . . they say he can't do things and he can do things. . . ." There was much concern about "poisonous things" that the boy might have to eat, and many confused phantasies about birth, about "giants eating up people." While the play sessions mostly reflected an underlying intense anxiety, hostile phantasies were also present, and in marked contrast with his social behavior, as can be seen in excerpts from his report for the first month at school: "aloof . . . at first completely non-aggressive, showing hostility only by facial expressions and complaints to the teacher . . . with any frustration, he comes to his teacher for help, relying almost only on words. . . ." This child had an extremely large vocabulary which included words totally incomprehensible to the other children, and in the course of his attendance at school he became verbally aggressive, but physical aggression, even before he left school at 4½ years, was mostly tentative and ineffectual. Guilt feelings, not as related to the problem of enuresis but, rather, to the need for good behavior, were noted.

Boy #61 (2 years 0 months to 4 years 7 months), I.Q. 125, 131, 156, an only child, was at first quite hesitant in the playroom and "May I" was a frequent question before he attempted any play. There was expressed considerable anxiety about a phantasied baby who bit him, also guilt reactions about the "naughty, naughty boy" (himself). His only form of aggression in the social group was infrequent, impulsive biting of the children toward whom he was generally aloof. Stuttering was noted and treatment was suggested. Considerable work was done with the parents, especially the mother, with good results, despite the mother's own problems. In passing, note the rise in intelligence quotient.

The phantasy life of these children is therefore characterized by hostility, coincident with repression of normal aggressive impulses, and intense guilt feelings and self-punishment. Anxiety is manifested diffusely in the general apprehensiveness observed in social contacts as well as in specific areas and dreams. The content of phantasies is often associated with water themes. The fact that these children experience difficulties in living out their aggression links the problem of enuresis with that of urethral eroticism and sadism, a link otherwise substantiated by the habit young children have of expressing hostility toward adults or other children in bathroom terminology. This is strikingly illustrated by the case of Boy #21, quoted above, and the daily records of nursery school children as a whole.

VI. RELAPSES IN TRAINING

Relapses in training generally involve both bowel and bladder control, but this is not always the case. A few children had relapses in bladder control alone, and fewer had relapses in bowel control alone. Relapses were noted in both non-enuretic and enuretic children, as previously defined. Children who had been continuously enuretic were not included, whether or not the bed wetting had shown considerable variations, if there had not been at any time a marked tendency toward achievement of clean habits. Under these conditions eleven children (6 boys and 5 girls) out of 74 children under observation in the period 1937-1943, had a history of relapses. Three of these children had two relapses, the others only one. Seven of them had a relapse in bowel control as well as bladder. In six children the relapse was coincident with the birth of a sibling (one of these had a relapse with each of two siblings born when she was respectively 1 year 2 months and 2 years 5 months). In one case (Boy #21) reported above, the child had a bowel and bladder relapse coincident with his placement in a boarding home under traumatic conditions; two bladder relapses (Boy #36 and Boy #61) took place when the nurses in charge suddenly left the home—one subsequent to a physical injury, the other when the mother sent the nurse away after hearing her tell the child, "Do it for me," during micturition. One girl (#32) trained before 20 months had a relapse shortly after

this when taken on a visit to her grandmother in the Middle West. There was also in this case a severe relapse in bowel training, with smearing of clothes, walls, etc.—at 3½ years—coincident with the birth of a sibling. Finally, one girl (#51), referred to above, had a relapse in bladder control at 2½ years, following the parents' divorce.

Seven of these relapses took place while the children were at the nursery school and it was possible, therefore, not only to secure data on school and home behavior but also to investigate inner phantasies in the playroom set-up. Relapse was precipitated in five by the birth of a sibling at ages varying from 2 to 3½ years. Hostile phantasies directed to the baby were freely expressed by the five children, although there was no outward manifestation of hostility reported at home. While this observation does not describe the total sibling relationship, it falls in line with the general statement formulated above regarding the inability of these children to express their hostility.

VII. CHILDREN TRAINED AT ONE YEAR OR UNDER

There were two boys trained at 9 months, and one girl trained before 11 months; also two boys and one girl trained at 1 year. The first three children represent the extremes of early training in the group of 60 children with full data. Their personality presents more contrasts than similarities with the enuretic children. The three children were also apprehensive in the social group, as shown by the following excerpts from their records: Boy #2, only child, (2 years 6 months to 3 years 10 months) I.Q. 78, 100, "visibly cringes at almost any hint of physical contact . . . his hostility largely a matter of facial expression and attitude." Boy #63, only child, (4 years 10 months to 5 years 6 months) I.Q. 105, "improvement in group relationships came slowly, rather steadily, child learning to stand up for himself instead of whining or watching silently . . ." (final report). Girl #49, older of two children, (2 years 8 months to 4 years 3 months) I.Q. 137, 121, "anger and frustration usually caused by someone's taking a toy or teasing her, or, mingled with apprehensiveness because another seemed to be approaching too near when she was on any apparatus. In the latter case, usually appealed to adults for help . . . rather fearful of all new situations, needing constant reassurance . . . friendly and talkative with adults, becoming anxious over other children's aggression toward them (adults). . . ." However, in contrast to the enuretic children there is in these three children a tendency toward rigid behavior, in fact mildly compulsive characteristics, as shown in the following excerpts: Boy #2, during the first months at school, showed "a peculiar ritual-like activity: with head bent to one side, eyes lowered, he revolves slowly on his feet, body quite rigid . . . holding buttocks as he walks or plays (in a 4-5 day period of mild diarrhea) . . . grimacing and blinking when apprehensive. . . ." Boy #63, ". . . undifferentiated excitement for several weeks when getting undressed for bed . . . in first week, several times walked rapidly up and down, hitting head rhythmically with palms of hands . . . involuntary facial movements, apparently hostile in character, when meeting aggressive children . . . frequent stammering. . . ." Girl #49, "hair chewing and twisting . . . occasional rapid blinking of eyes when self-conscious before adults . . . stuttering."

These children tended to be too well behaved, with sudden short outbursts of excitement. There was no thumb sucking or associated periods of dreaminess indicative of self-indulgence (infantile eroticism), as were commonly found in the enuretics. *There was a tendency toward over-organization, in contrast to the loosely organized personality structure of the enuretic children.*

VIII. REVIEW OF THE LITERATURE

A survey of the literature shows the preponderance of studies on enuresis rather than systematic presentation of observations on the development of elimination control.

Statements from several authorities on the achievement of bladder control reflect a wide divergence between American and European attitudes toward the problem. For instance, Gesell (10) indicates that at 18 months the child is regulated for bladder and bowel control, at 24 months is dry at night if taken up, at 36 months responds to routine time without having to void between these times, and at 42 months is dry at night without being taken up. There is no specific mention of time at which the average child is expected to be dry during the day, but *3 years* seems to be the approximate level fixed for achievement of bladder control during the day, and *3 1/2 years* for night cleanliness. No correlation between methods of training and attainment of control seems to have been made.

Kanner (13) reports that at 18 months 30 per cent of children, and at 2 years between 65 and 80 per cent, have "good bladder control," and at *3 years* the average child is expected to be dry day and night. There is no indication of which cultural groups are involved in these figures, and no evidence of correlation between training and results.

Bakwin (1) writes, "By enuresis is meant the repeated involuntary discharge of urine after the *second year* of life." Twenty-three per cent of patients seen in the Bellevue Pediatric Out Patient Department are enuretic, according to this definition. (Urinary incontinence due to organic lesion is not included.)

Pichon (25) quotes the rule formulated by Heuyer in his teaching that at *15 months* the child should no longer wet his bed or his clothes. European pediatricians and psychiatrists tend to adopt levels closer to this figure than to that established by American authorities, although Heuyer's figure is somewhat lower than those adopted by other European authors. It is difficult, however, to compare writings found in the literature, as frequently the criteria for enuresis (age level—day and night—relapses or continuous failure—psychological and somatic factors) are not defined.

The problem of enuresis is closely related to that of normal development of control, and the latter is often defined by implication from the many studies on enuretics. The literature on enuresis is so abundant that only the briefest presentation can be made of the essential trends. Foremost in the field are the studies of Michaels and his group. Michaels and Goodman (19) studied a large number of children in the Detroit Recreation Camp and reported that the following five "traits" were found more frequently in combination than singly: enuresis, thumb sucking, nail biting, speech impediments and temper tantrums. They considered enuresis indicative of "an ill-balanced personality (faulty integration of the different level components)," and placed as much emphasis on constitutional as on environmental factors. Later writings of the same authors (20) brought out further facts of varied significance: for instance, the fact that left-handedness is less revealing than enuresis as a clinical index of an "ill-balanced personality," though it is often associated with enuresis, temper tantrums, sleep disturbances, daydreaming and failures in school. These authors (21) emphasized the significance of the five traits previously listed, and Michaels (18), in his study of adolescents and adults, showed that the incidence of enuresis, poor sleeping habits and left-handedness was higher in delinquents than in their sibling controls and in two groups of normals and psychotics respectively. The persistence of enuresis after 8 and 11 years was also higher in the delinquents and their siblings than in the normals and psychotic patients. Michaels concluded that "the higher incidence of enuresis and its longer persistence, as revealed in the present study and in other investigations, strengthens the conception of the *intimate relationship between enuresis and delinquency,* that they are both expressions of some common fundamental disorder in the personality." In a later paper Michaels and Goodman (22) emphasized the "association of male, psychopathic personality and enuresis," and suggested that "enuresis in its stubborn persistence reflects psycho-somatically the lack of an internal inhibitory agency just as delinquency later reflects this lack socio-psychologically." In this light, enuresis might possibly be considered "a prophetic indicator of psycho-biological reactivity."

The relation between aggressive behavior and enuresis was established incidentally by other students of delinquency. Healy and Bronner (11) stressed the hyperactivity found in delinquents also reported by other observers. In attempting to find structural or functional characteristics of the central nervous system which could explain the uninhibited behavior, they were "forced to conclude that there is evidence that emotional thwartings and dissatisfactions themselves, dating back to very early years, may be the inciting cause of hyperactivity." This was brought out in studies of delinquents and non-delinquent controls, which included developmental histories. Comparative tables showed that "many more of the delinquents than of the controls had been subject to interference with healthy normal development." As in the studies of Michaels, the persistence of enuresis was noted in the delinquents. In their analysis of personality characteristics, the authors indicated that uncontrolled, uninhibited physical impulses, identified with aggressive behavior, were found extensively among delinquents and concluded, "We are forced to agree with some other students of behavior problems that hyperactivity on the part of children is strongly related to the appearance of delinquency." Since information regarding the first two years of life is extremely meager, and dynamic correlation is not available, the linking of enuresis, hyperactivity and aggression (and delinquency) is made only in children of kindergarten age and above.

Gerard (8) analyzed six cases of enuresis (3 boys and 3 girls) with onset after 5 years, and not following the birth of a sibling. She found "evidence of passive male and of active female behavior," and interpreted these attitudes as "techniques of defense against anxiety," passive attitude protecting the boy from danger, while urination in the girl is "conceived by her as an aggressive destructive process." Gerard (9) reported further that a few cases were "regressive cases" (sibling birth precipitating the regression), a few were "revenge response cases," and the majority of the total number in a large group were cases of nocturnal enuresis with unconscious mechanisms operating. She found in these cases a common etiological factor, "fear of harm from persons of the opposite sex."

Kanner (13) outlined behavior problems associated with enuresis as follows: feeding difficulties, 32 per cent; temper tantrums, 26 per cent; nail biting, 24 per cent; fear reactions, 12 per cent; encopresis, 10 per cent. In the majority of cases he found "a general immaturity," and described enuresis as "one of several manifestations of a general habit disorder."

Huschka (12) found 36 children, out of a group of 215 problem children seen in the New York Hospital pediatric clinic, still enuretic after 3 years (3 to 14 years), and in 28 per cent of these patients the method of training had been coercive. Of the patients known to have been coercively trained, 63 per cent gave indications of potential "unhealthy psychosomatic adaptation."

Evans (6) presents cases observed in pediatric practice and indicates that the therapist should focus his attention on "the personality of the child and its environment," but only after ruling out any "infectious, toxic, metabolic, developmental or degenerative process." In two of the cases there is evidence of the association of symptoms outlined by Michaels, and enuresis is treated "indirectly" through an understanding of the child's relation to his family and the psychodynamics of his behavior. Evans' view of the therapeutic outcome is optimistic: "If the nature of the child's problem is thoroughly understood, treatment becomes facile and rational."

Bakwin (1), from his pediatric experience, considers three major etiological factors in the development of enuresis: "the 'irritable bladder,' the character of the training for vesical control and the psychologic interrelationships between the child and his environment." He also points out that parents who had been enuretic themselves generally tend to be more lenient toward training, though occasionally they are, on the contrary, more exacting.

Mowrer and Mowrer (24) report an observation on children in primitive cultures which stimulated them to create some apparatus devised to awaken a sleeping child, immediately after the onset of micturition. This observation is that the primitive child's voiding on the mother's naked body causes the mother's awakening. They state that if civilized societies "must have the benefit of this more civilized form of conditioning, it is clear that some automatic mechanical arrangement will have to be provided." Good therapeutic results are obtained through this method, according to their report.

McGraw (14), basing her conclusions on the daily observation of two sets of twins, pointed out that distinct phases in obtaining bladder control are "not altered by imposition of a training program." Hypersensitive reflex action, lessening in reflex sensitivity, onset of cortical participation are the successive phases, which do not proceed at a regular, gradual pace. Measuring the frequency and amount of voidings does not provide evidence of a basic physiologic rhythm which could serve as a starting point for the establishment of a training schedule. It was suggested that training be initiated only after the child's behavior reveals cortical participation in the act of voiding.

McGuinness (16) reports that 12 to 15 per cent of all "nervous" children are enuretic, which is a conservative figure as compared with most statistics. The analysis of hereditary factors showed that in 30 to 40 per cent of the cases the parents had been enuretic in their own childhood. Neurogenic and psychogenic factors were suggested, and common sense handling of the problem with a variety of approaches was recommended.

The European literature is also more abundant in publications on pathological than on developmental aspects of bladder control.

McGregor (15) attempted to classify the 70 cases he studied into "three temperamental groups": nervous or excitable, normal, phlegmatic (this terminology from the parents' account). Seventy per cent of the total number of enuretics were found in the normal group. The author holds an optimistic view of the problem of enuresis, since in his opinion "most of the cases may be cured by simple procedures based on encouragement or suggestion."

Weigl (28) considered enuresis a neurotic infantile deviation, which shows a tendency to remission, with or without benefit of treatment. In a large group of problem children, he studied factors related to: (1) "position in the family" (economic stresses, traumatic events, position in sibling sequence, etc.), (2) miscellaneous factors, as age, inflammatory diseases, correlated neurotic symptoms, sex, prognostic and therapeutic factors. He found no typical differences between enuretics and non-enuretics, and concluded that neurotic reactions found in enuretic children were probably related to the method of training.

Reiss (26) stressed psychological factors, after excluding such cases as spina bifida occulta (posterior), which represents 60 per cent of the enuretic children total. Like Michaels, he makes a distinction between (1) children who were enuretic from birth (no training achieved), (2) those who became enuretic as the outcome of a relapse in training. Bladder control is viewed as an act of social adaptation, and enuresis as a fixation at a certain level of development in the child's instinctual life. Enuresis is only a symptom, and the total personality of the child must always be taken into consideration. In his opinion, attempts to associate character traits with urethral eroticism have met with failure.

Christoffel (2) expresses a divergent opinion and states that the relations between character and enuresis are underestimated. He also calls attention to the "psychogenic retention of urine of the enuretic type," an observation which may have a bearing not only on variations in enuretic patterns but also, and more significantly, on neurotic symptoms associated with the urinary function.

Schachter and Cotte (27) analyzed the records of 1,962 children brought to their attention for a variety of behavior and neurotic disorders. Four hundred and sixty-one (23 per cent) were found to be enuretic, either formerly or at the time of examination. This figure is similar to those reported by Kanner (U.S.), Murdter (Switzerland) and Weigl (Roumania). Two hundred and ninety-three children were enuretics when seen at the clinic, 77 per cent of this number between the ages of 3 and 10, and 23 per cent between 11 and 21 years. There were more boys than girls, with a ratio of two to one in the 3 to 10 year group, and three to two in the 11 to 21 year group. As commonly reported, nocturnal enuresis was more frequent than diurnal enuresis. Schachter and Cotte point out that there are more enuretics in the families of enuretic children than in those of non-enuretics. No attempt was made to differentiate between physical and psychological factors, and this omission is emphasized by the analysis of parental pathology. In the direct antecedents, the importance of the following findings is stressed: alcoholism, 45 per cent; malaria, 16 per cent; syphilis, 7 per cent; tuberculosis, 7 per cent. The authors establish a relation between low intelligence and enuresis, which brings further evidence that organic cases were included.

IX. DISCUSSION

McLellan (17), in defining the neurophysiology of the bladder, emphasizes that the bladder is a reflex organ and that voiding in the infant is purely a reflex act before the higher centers are developed. The period of development during which the higher centers begin to function is not given, and the author indicates that the growth of the suprasegmental inhibitory control is indistinguishable from the growth of the nervous system in general. It is not possible to find a specific anatomical center, according to this author who, on the other hand, emphasizes that "the development of cerebral or suprasegmental inhibitory control would appear to be the most significant function in the control of bladder activity."

According to Ford (7) there are three sets of *segmental nerve fibers:* (1) The pelvic nerves (from S 2-3-4 to peripheral ganglia of the vesical mucosa). These parasympathetic fibers bring about the contraction of the bladder and relaxation of the internal sphincter, and afferent fibers transmit sensations of distention and pain. (2) The hypogastric nerves. These sympathetic fibers arise in L 1-2 and end in the hypogastric ganglia. Their function is to reduce the muscular tone of the bladder, increase the tone of the internal sphincter, and close the ureteral orifices. Vasoconstrictor fibers in the bladder mucosa, and afferent fibers transmitting sensations of distention and pain are also present in these nerves. (3) The pudic nerves (automatic nervous system) which innervate the external sphincter and supply sensibility to the urethra. The *voluntary control* of the bladder is operated through the upper paracentral lobule of the motor cortex, close to the area of the motor control of the legs, and the afferent fibers from the cortex to the spinal cord seem to be part of the pyramidal tract. Other suprasegmental structures presumably playing an important part in the act of micturition are found in the mid-brain (Langworthy).

Monakow and Mourgue (23) report that the myelinization of the paracentral lobule takes place about the fourth month after birth, and that the total myelinization of the long association fibers and fine cortical fibers, also partial myelinization of the Flechsig center of association fibers are noted from 4 to 8 months. At 1 year the myelinization of the long association fibers, the cortical and tangential fibers is further advanced, and reaches what the authors describe as the "late phase," while the "terminal phase" corresponding to the full attainment of complex and finer movements is reached at from 4 to 5 years.

Since the object of training is to establish voluntary control of the urethral sphincter, it is obvious that myelinization of the cortical fibers must be achieved before attempts at training are successful. While "training" based on segmental conditioned reflex is possible, it is undesirable since the paths through which voluntary control can be operated are not mature. One would expect disturbances in personality function as well as disturbances in urinary function, as a result of early excessive demands upon immature cortical pathways. Only three children in the group studied were fully trained before 1 year, so it is impossible to draw general conclusions, but the tendency toward personality over-organization and compulsive behavior is in line with the observation formulated above, and with observations found in the literature.

A special aspect of the act of micturition, which has not been emphasized enough and warrants further investigation, concerns itself with training in the boy. *Actually, the boy, unlike the girl, goes through two successive trainings.* He must first learn to void sitting down, then to void standing up. The latter phase takes place after the child has learned to walk, some time after bladder training has begun, and in some cases has already been achieved. Several factors are involved in this phase, and they unquestionably play a part in the predominance of boys among enuretics. To void in the standing position represents a further step in complexity of motor attitudes and requires a further degree of nervous maturation. Stability of

the lower limbs and equilibrium are needed at a stage of development when walking still shows a lack of coordination, which has often been compared with motor ataxia. Furthermore, the necessity to direct the stream requires both the development of finer manual dexterity on the part of the child and manipulation on the part of the adult training him. Finally, dissociation in the control of the urethral and anal sphincters must be established. This achievement probably requires finer differentiation in the boy than in the girl, since the two sphincters to be controlled independently are closer in the boy than in the girl. All of these factors tend to increase tensions in the voiding situation; such tensions can be expressed somatically or emotionally and are dependent on the degree of individual maturation, type of training, emotional relation to the adult, etc. However, no specific data are available regarding the age at which the boys included in this study learned to void in the standing position.

Any factor which brings discontinuity in the establishment of behavior patterns is likely to interfere with the progress of training. This is as true of the shifting from sitting to standing position as it is of changes in persons, situations and attitudes. It is not uncommon for a child fully trained to regress for a brief period upon entering nursery school. It is usually the first time that a child has left his home, routines are changed, and even the type of toilet equipment differs, since nursery school bathrooms are brought to child dimensions. Children react differently, some enchanted by the multiple toilets which they sometimes try all in turn. Some apprehensive children, however, have been observed not to void for long periods, and in the case of three boys (Boys #2, #13, #69) the apprehensiveness was so acute that an individual approach had to be formulated. With Boys #2 and #13, the mother and the nurse respectively were asked to help the child over the crisis. With Boy #69, a special technique along the lines of play therapy was carried out with good results. A brief presentation of the pertinent facts in this case will serve to illustrate the underlying principles and the technique. During his first twelve days at school, the boy would not void except on three occasions: the first day when in the bathroom alone with his father, the fourth day when his maid came from home and cajoled and threatened him into voiding, and the eighth day with the maid again present. Otherwise he would go about in great discomfort, grunting and clutching at his genitals, unable to concentrate on anything. All attempts to help him were met with resistance, anxiety and tears. At the outset there may have been a tendency on the part of both home and school to exert too much pressure in the voiding situation. After a brief staff conference the special technique was decided upon, and recommendations made to ignore the voiding problem as such. While there had been sand and water play in the group from the start, individual water play in the bathroom alone with the teacher was initiated at this point. In these sessions the boy progressed from having rubber dolls "wee-wee" into the toilet to their doing it on the floor, and finally on the teacher. On the thirteenth day, while sitting on his teacher's lap in the bathroom, he wet himself and her. During the next two days he voided on the floor or in his clothes, and finally began voiding in the toilet at the end of the fifteenth day. After that time he used the toilet consistently, and there were no further accidents. At first he voided (one to three times a day) only when his own teacher was present, but toward the end of his first year at school he could accept other adults. His retention span was longer than that of most children, and after two years at school he did not always use the four routine voiding times.

Frequency of micturition and lack of voluntary control represent a considerably more common problem than retention, as can be seen from the records. It is possible that, as suggested by Christoffel (2), "psychogenic retention of urine" in some enuretics explains variations among enuretics, but accurate observations on the retention span of children in this group are not available; however, it can be said that the children who experienced difficulty in voiding in the new (school) situation were not among the enuretics, and the three children referred to above had been fully trained before 2 years. Clinically, urinary retention in these young children is closely related to intense anxiety, the dynamics of which (in these three cases) seem to be tied up with a feeling of insecurity in relation to the mother.

Until recent years there has been a tendency to consider elimination training a purely biological problem. Even considered as such, the facts of maturation of the central nervous system have frequently been ignored, and many infants have been required to develop neuromuscular and behavior patterns before they were biologically ready. It is also obvious that rates of maturation show variations from one individual to another, even in a fairly homogeneous group, as our data on early psychomotor development amply demonstrate.

Evidence is fast accumulating concerning the importance of emotional factors in the successes and failures of training for sphincter control and their repercussion on the personality development of young children. The material presented here adds further evidence to this effect. Even in this condensed form it shows that while a threshold level of maturation is necessary to make training successful, there are other considerations of equal if not greater significance.

The fact that some children who reacted intensely toward being wet were also active babies with early psychomotor development and early training, points to a *somatic orientation of reactions to the environment.*

The anamnesis of enuretic children, on the other hand, shows a totally different picture: their psychomotor development is relatively late; the period of infantile eroticism, characteristic of infancy, is marked by their lesser motor activity and prolonged indulgence in oral gratification (persistence of thumb sucking—relatively greater desire for food). Their difficulty in expressing normal aggression in their first contact with other children is in keeping with the psychosomatic pattern described here,—all of which corresponds in some respects to what has been described by various authors as "immaturity." The so-called constitutional factor which is frequently mentioned in the literature on enuretics probably refers to the same characteristics, though the implications of immaturity are both somatic and psychologic, whereas the constitutional factor relates exclusively to qualities inherent in the soma.

The analysis of records of enuretics and relapses in this study has pointed to unexpressed hostilities, early in the socio-emotional adjustment of the children. Psychologically, enuresis could be conceived as a sadistic expression, *substituted for the normal expression of aggressive attitudes in the child's early development.* Whatever forces may be operating in the blocking of aggression, they vary from one individual to another, but the relation between the suppression of aggressive impulses and the enuresis seems well established in the cases studied. The abundance of data found in the English war literature (5) has emphasized enuresis as a somatic substitute for blocked hostile and aggressive impulses.

This conception appears at first to be at variance with Michaels' (18) formulation that enuresis and delinquency both reflect the lack of an "inhibitory agency," the former psychosomatically, the latter socio-psychologically. However, the discrepancy is probably only apparent because the children included in this study are younger than Michaels' groups. Furthermore, information regarding the early behavior of children in Michaels' groups seems to be lacking. The aggressive attitudes found in delinquency may be later developments representing mechanisms of defense against the fundamental inhibitions of earlier years.

Persistence of the narcissism of infancy referred to above can be looked upon as an effect of unclear inherent somatic and/or psychological factors, as well as a determinant in the under-organization of the personality, which is characteristic of the enuretic children in the preschool age group. Very early adjustment to the social group can be and is impaired by the persistence of instinctual demands of earlier levels. The fact that these children are so inhibited in their social approach probably makes it necessary in later years to develop over-aggressive attitudes.

It has been pointed out that the children included in the nursery school group were trained relatively late, and that the proportion of children considered enuretic was relatively high. On the other hand, in a majority of the children trained late, there was noted inconsistency in the method of training, due principally to the fact that few of the children had been handled exclusively by their mother or the nurse in charge. Inconsistency played an important role in delaying the achievement of training. Inconsistency can be manifested not only through multiplicity of methods and persons but also through any one person, as a result of this person's own neurotic attitudes. The data presented above amply demonstrate these points. Inconsistency in any form, whether referring to techniques or emotional attitudes, seems to be quite destructive.

X. SUMMARY AND CONCLUSIONS

Of 74 children admitted to the Payne Whitney Nursery School during the years 1937-1943, 60 were found to have complete records on training for bladder control. Computed averages indicated: achievement of bladder control (day) at 21.4 months; achievement of bladder control (night) at 27.28 months; age at which training began (35 children) 12.8 months—*i.e.*, relatively late, as stated above. The methods of training used were found to have a bearing on the success or failure of training, and conspicuous as factors conducive to failure were inconsistency and neurotic attitudes of the person or persons in charge of training. Hereditary factors could not be reliably checked. There seemed to be, in the early months of life, differences between infants regarding their reaction to being wet, and the group of infants who reacted more intensely were children characterized by early psychomotor development; they were also among the earliest to achieve bladder training. Enuretic children, arbitrarily defined as children who were not trained for day at 2½ years and night at 3 years, formed 23⅓ per cent of the group of 60 children. There were 10 boys and 4 girls. These children fed and gained well as infants, their psychomotor development was relatively late, they were quiet sleepers, thumb sucking was present in all, and some of them exhibited other infantile habits for longer periods than is usually noted. Early in their contact with other children they experienced difficulties in giving outward expression to their normal aggressive impulses. Tantrums were observed in several of them. Their phantasy life and dream content were character-

ized by hostility, intense guilt feelings and self-punishment, and these were particularly brought out in the relapses associated with the birth of a sibling. There was a tendency toward loose organization of the personality and a persistence of infantile demands for gratification beyond the usual age levels. On the other hand, the children who were trained early (1 year or under) showed a tendency toward over-organization of the personality; in fact, mild compulsive tendencies. The psychodynamics are analyzed, and enuresis is presented as a sadistic expression, substituted for the normal expression of aggressive attitudes in the child's early development. A correlation is established between the predominance of enuresis among boys and the fact, not emphasized enough, that the boy actually goes through two successive trainings, first sitting down, then standing up. A few cases of retention on a psychological basis are discussed and a method of approach for their handling is presented. The European and American literatures are reviewed. It is suggested that training be initiated not earlier than 8 months, when an adequate level of maturation of the structures involved is reached; also that it be carried out consistently by the person with the most satisfactory emotional relation to the child. The training of the boy to void in the standing position should not be started until he is able to stand alone securely—an age which varies from child to child but can be arbitrarily defined as from 2 to 2½ years. One could expect bladder control to be achieved for day at 2½ years, for night at 3 years. Minor variations from these figures would still be considered as within normal limits, but if a child has not reached full control between 4 and 5 years, all physical causes being excluded, the psychogenic factors should be carefully investigated and psychotherapy instituted.

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THE GENETIC FACTOR IN AUTONOMIC NERVOUS SYSTEM FUNCTION

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INTRODUCTION

This paper will present the results of an attempt to demonstrate a genetic factor in the patterns of autonomic nervous system function in children. The existence of such a genetic factor in autonomic activity or response might go far toward explaining the familial pre-disposition toward such psychosomatic conditions as benign essential hypertension, coronary disease, mucous colitis, Raynaud's disease, etc.—a predisposition which many workers believe they have observed.

The malfunction of an organ as the result of emotional stresses implies at once the greater than average physiological component of the individual's emotional responses to stimulus, a lowered general threshold of stimulation, or a lowered specific organ resistance predisposing it to malfunction. By measuring the activity of certain organs which are dependent for their function on autonomic stimulus, it is possible to acquire some picture of the state of activity of the autonomic nervous system itself, and then to compare the degrees of that activity and also the selective expression of it in two or more individuals. Measurement of skin resistance, systolic and diastolic blood pressure, heart rate, salivation, respiration and vaso-motor persistence time form a pattern which expresses, to some degree at least, the function and state of activity of the autonomic nervous system. Inspection and statistical treatment of such measures on a large group of children make it possible to determine whether monozygotic twins closely approximate each other in autonomic pattern, whether siblings are less alike than the monozygotic twins, and finally whether random selected unrelated children, matched for age, resemble each other in autonomic pattern less closely than do the siblings and monozygotes.

DATA

The data for this analysis were gathered during the past three years at the Fels Research Institute. This is part of the longitudinal study being carried on by this group. Longitudinal scores of physical and psychological growth are taken as well as those of physiological reactivity described in this paper. The method and measures have been described by Wenger and Ellington,[1] but a brief review of the process will be given here.

Measures of vaso-motor persistance, salivary output, heart period, standing palmar conductance, reclining volar conductance, respiration period and pulse pressure were obtained under the following standard conditions. All the measurements were made during the hours of 9-12 a.m., at least an hour after breakfast, in a quiet room in which the temperature and humidity were controlled at 74°-76° and 40% respectively. The subjects were all from the Fels study and were between 6 and 12 years of age. There were 62 subjects in the 1940 study, 74 in the 1941 study and 81 in the 1942 study.

Vaso-motor persistence was elicited by means of a firm slow stroke applied over the biceps of the left arm by a stimulator calibrated to deliver approximately 250 grams of pressure. Two strokes were made in the form of an X, the stop watch was started at the incidence of the first stroke, and the time was recorded to the nearest minute at which the location of the "crossing" was no longer a matter of certainty. The persistence time ranged from three to thirty minutes. *Salivary output* was measured for a period of five minutes. The saliva was collected in a graduated centrifuge tube by means of a simple suction pump. The subject was instructed to bring the saliva to the front of the mouth and it was taken out by the suction. *Heart period* was obtained from minute samples taken over a twenty minute period. The heart was recorded electrocardiographically and the period consisted of the time in seconds between the QRS peaks. *Standing palmar conductance* was obtained through the use of Darrow's circuit. The electrodes were placed in the palms of each hand and the subjects were instructed to stand erect with their weight supported equally on both feet.[2] *Volar skin conductance* was made in the same manner as the measure above except the electrodes were placed on the forearm just above the wrist and the subjects were in a reclining position. *Respiration period:* the respiration was recorded on a polygraph moving at a speed of 3 cm. per second. The period was time between peaks on the respiratory curve. *Pulse pressure* was obtained from six measures of systolic and diastolic blood pressure taken in the twenty minute period.

The measure of *"autonomic balance"* is a composite of the seven variables above. This measure has been described by Wenger.[1] It is obtained by weighting the values of the various measures, the weights having been derived from a factor analysis. The measure

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[1] Wenger, M. A., and Ellington, M.: The measurement of autonomic balance in children: Method and normative data. Psychosomatic Med., 5:241. 1943.

[2] Conductance in microohms x 1000 equals 1/R, where R is mean resistance in thousands of ohms.

expresses the degree of sympathetic or parasympathetic preponderance.

METHOD

Two methods of analysis were used. The first consisted of correlating the paired individuals in the three groups on the various measures. The scores of each twin were correlated with those of his partner, those of each child with those of his siblings, and a large sample of the scores of unrelated children were correlated with each other. The age factor was eliminated by the use of standard scores computed for each age level. The number of pairs for the years 1940, 1941, and 1942 were 5; 5 and 6 for the twins; 10, 19 and 25 for the siblings; and for the unrelated group 361, 324 and 324 respectively. This unrelated group represents a random comparison of cases and is sufficiently large to be stable.

TABLE I

CORRELATIONS OF THE TWIN, SIBLING AND UNRELATED GROUPS FOR THE YEARS 1940, 1941 AND 1942

	Correlation	N
1940		
Twins	.434	5
Siblings	.255	10
Unrelated	.164	361
1941		
Twins	.470	5
Siblings	.406	19
Unrelated	.017	364
1942		
Twins	.489	6
Siblings	.288	25
Unrelated	.080	300

The second method of analysis consisted of deriv- case their difference score would be 3. Two siblings For example, a pair of twins might have standard scores on a particular measure of 45 and 48; in this case their difference score would be 3. Two siblings might have scores of 48 and 55; in this case the difference score would be 7. Two unrelated children might have scores of 45 and 60; here the difference score would be 15. In all instances the lowest scores indicate that the individuals are little different in the particular measurement.

RESULTS

Table I presents the correlations of the seven variables for the twins, siblings and unrelated groups. In all cases the correlations are in the direction predicted by the hypothesis that there is a genetic factor in autonomic nervous system function. The twins are more highly correlated than are the siblings and the siblings show higher correlations than the unrelated group. The measures are also consistent over the three year period. The correlations are not significantly different, but are suggestive in that they all point in the same direction; that is, toward a genetic factor. For the years 1940, 1941 and 1942 the twin correlations are .434, .470 and .489 respectively; the sibling correlations are .255, .406 and .288 respectively; and the unrelated group correlate .164, .017 and .080 for the three years.

Table II presents the data obtained from the differential analysis. The means, number of pairs, critical ratios and probabilities for all the groups are given here. The more striking differences may be enumerated.

The measure of *vaso-motor persistence* is significant at the .01 level for all the three years between the twins and unrelated groups, and at the .01 level between the sibling and unrelated groups, for the last two years. The difference between the twins and siblings in this measure is not significant, but is in the direction indicated by the hypothesis. The measure of *standing palmar skin resistance* is reliable at the .05 level between the three groups except for the 1941 measures between the twins and siblings and the siblings and unrelated groups; it is significant at the .05 level between the twin and unrelated groups for that year. *Reclining pulse pressure* is significantly different between the twins and siblings and the twins and unrelated groups for two of the three years. These are at the .05 and .01 levels for the 1940 and 1942 measures respectively. The differences between the siblings and the unrelated groups is significant at the .05 level for the 1942 measure only. All other differences are in the expected direction, but are not significant. *Total salivation* is significantly different between the twins and unrelated, and the siblings and unrelated groups in two of the three years, but there is no significant difference between the twins and siblings; in fact, there is a reversal between these groups for the 1941 measure. The measure of *mean respiration period* is significant only in the 1942 measures and then only between the twins and unrelated, and the sibling and unrelated groups. The differences for the other years, although they are not significant, are in the expected direction. *Mean heart period* is significant for the same year and groups as is the respiration period. The critical ratios for all measures are low but in the expected direction. *Reclining volar conductance* shows significant differences between the twins and siblings, and the twins and unrelated groups in the 1940 study, but no significant differences appear in the other years.

The measure *"autonomic balance"* which is a composite score of the above variables shows some significance between the groups. The difference between the twins and siblings in the 1940 study is at the .05 level

as is the difference between the twins and unrelated groups for the same year. All the other measures are in the expected direction except for a reversal in the 1941 study between the twins and siblings. This is due to the fact that the highly weighted measure of *total salivation* is reversed for this year.

monozygotic twins. Comparison of the measures of siblings with those of twins shows them to be less alike than those of the twins. Similar comparisons show the unrelated less alike than the siblings and the unrelated less alike than the twins. Most of the differences are statistically significant. Correlations of the

TABLE II

MEANS OF THE DIFFERENCES IN PHYSIOLOGICAL MEASURES OF MONOZYGOTIC TWINS COMPARED WITH THOSE OF SIBLINGS AND UNRELATED CHILDREN PLUS A SIMILAR COMPARISON BETWEEN SIBLINGS AND UNRELATED CHILDREN

Measure year	Twin mean	N of pairs	Sib's mean	N of pairs	Un. R mean	N of pairs	Twin-Sib C. R.	P	Twin-Un. R C. R.	P	Sib-Un. R C. R.	P
Vaso-motor persistence												
'40	2.60	5	6.70	10	11.80	361	1.35	—	6.75	.01	1.80	—
'41	5.60	5	7.00	19	12.37	324	.62	—	3.98	.01	3.22	.01
'42	1.17	6	4.45	25	11.26	324	2.06	—	6.25	.01	5.25	.01
Palmar standing skin resistance												
'40	3.60	5	8.83	10	11.34	361	2.64	.05	4.07	.01	2.44	.05
'41	6.40	5	11.42	19	12.35	324	1.56	—	2.20	.05	.54	—
'42	4.67	6	8.64	25	13.40	324	2.29	.05	6.10	.01	3.88	.01
Reclining pulse pressure												
'40	3.00	5	9.00	10	11.08	361	2.61	.05	7.60	.01	.97	—
'41	6.20	5	8.68	19	8.93	324	1.00	—	1.23	—	.16	—
'42	4.50	6	8.76	25	12.98	324	2.46	.05	5.45	.01	3.36	.05
Total salivation												
'40	5.40	5	6.50	10	12.04	361	.55	—	5.22	.01	3.29	.01
'41	7.80	5	6.00	19	12.44	324	— .92	—	3.04	.05	5.20	.01
'42	8.67	6	9.24	25	9.97	324	.05	—	.41	—	.43	—
Mean respiration period												
'40	7.20	5	9.40	10	12.10	361	.56	—	1.93	—	1.56	—
'41	4.80	5	5.30	19	11.54	324	.25	—	4.24	.01	4.48	.01
'42	5.80	6	10.10	25	11.48	324	1.26	—	1.96	—	.65	—
Mean heart period												
'40	8.00	5	10.00	10	12.49	310	.62	—	1.60	—	1.51	—
'41	7.20	5	7.60	19	12.81	324	.17	—	2.72	.05	4.26	.01
'42	8.80	6	10.60	25	11.22	324	.45	—	.65	—	.34	—
Reclining volar conductance												
'40	3.60	5	11.60	10	10.54	310	2.78	.05	6.07	.01	— .40	—
'41	6.80	5	8.70	19	10.06	324	.52	—	1.00	—	.80	—
'42	5.50	6	8.70	25	7.01	324	1.28	—	.74	—	—1.09	—
Autonomic balance												
'40	4.80	5	10.50	10	11.71	144	2.27	.05	3.01	.05	.55	—
'41	11.50	5	8.28	19	13.91	129	— .21	—	.87	—	1.61	—
'42	6.17	6	11.10	25	13.78	307	1.97	—	3.25	.01	1.24	—

SUMMARY

Measurements of vaso-motor persistence time, palmar standing skin resistance, reclining pulse pressure, salivation, respiration rate, reclining volar conductance, "heart period" and "autonomic balance" have been made during three different years upon a group of children between 6 and 12 years of age. The group contained many pairs of siblings and six pairs of scores of pairs of twins, pairs of siblings and matched unrelated children show the correlations for the twins highest, siblings next and unrelated least. These results suggest that what one might call "autonomic constitution" may be at least partially an inherited characteristic. These findings should help to explain the genetic predisposition to many of the psychosomatic diseases.

THE CARBOHYDRATE TOLERANCE OF MENTALLY DISTURBED SOLDIERS *

H. FREEMAN, M.D., E. H. RODNICK, PH.D., D. SHAKOW, PH.D., AND THELMA LEBEAUX, M.A.**

As part of a broad investigation of the physiological processes of military neuropsychiatric subjects a study was made of the carbohydrate tolerance. The procedure used was that devised by Exton and Rose (1) in which there are three venous blood samples withdrawn in the post-absorptive state, at intervals of 30 minutes. Immediately subsequent to the first and second venipunctures, there is ingested 50 grams of glucose dissolved in 275 cc. of water. The blood sugar was determined by the Folin-Wu technic (macro-alkaline-tartrate).

The test has been used chiefly to differentiate between normal and diabetic subjects. In normal cases, the characteristic trend is an elevation of blood sugar after the first dose of glucose, from the control to the 30-minute reading, but a decrease after the second dose of glucose, from the 30- to the 60-minute reading. In diabetic patients the fasting blood sugar is usually abnormally high, the increase in the first 30 minutes is generally greater than normal and there is a further increase in the second 30 minutes.

Numerous investigations have been made of the carbohydrate tolerance in mentally disturbed patients (5) and have indicated a high incidence of abnormal values without satisfactory explanation. These studies were usually made with the 100-gram single-dose technic which in our hands has not led to consistent results (3). It is for this reason and because the present procedure is less affected by antecedent diets (6) that the two-dose method has been used.

The subjects studied included 20 normal soldiers assigned to a station hospital at an Army camp and 91 soldiers discharged for psychiatric reasons. The diet and activity of the two groups of subjects were fairly similar. The patients had been in the Army an average of 6 months before their symptomatology was of sufficient magnitude to require hospitalization. The average age of both groups was in the early twenties. The nutrition of the patient group was excellent, the average weight being 98% of the ideal (according to Metropolitan Life Insurance Company standards) with only 10% of the group being more than 20% overweight or underweight. At the time of the test procedure the patients were usually composed, no test being made on an unwilling or unduly excited subject.

The results of the procedure are shown in fig. 1. The mean values for the two groups of subjects are shown at the left. In the 20 normal subjects there is usually a characteristic increase (at 30 minutes) and decrease (at 60 minutes) in the blood sugar values. In the 91 patients there is commonly a similar increase for the first 30 minutes, though at a lower level, but a secondary increase at the one-hour reading.

Since these mean trends do not characterize all members of the two groups the subjects have been divided into two categories, those in whom the 60-minute reading is lower than the 30-minute reading ("downward trends") and those in whom it is higher ("upwards trends") (fig. 1). Fourteen of the 20 normal soldiers (70%) and 27 of the 91 patients (30%) exhibit "downward trends." Six normal subjects (30%) and 64 patients (70%) display "upward trends." This variation in reaction to glucose is not due to any difference in the levels of the fasting blood sugar since these are the same in both categories of patients and normal control subjects. It is not influenced by the levels of the 30-minute blood sugar readings because these bear no relationship to the "upward" or "downward" trend of the 60-minute reading. The 30-minute values are somewhat higher for those subjects showing a "downward" trend than for those in the other group but the difference between the two half-hour readings is not significant.

The chief difference between the normal soldiers and the patients lies in the 60-minute blood sugar reading and its relationship to the 30-minute level. This is shown more clearly in fig. 2 in the frequency distributions of the one-hour readings at (A) and the changes in the blood sugar in the second 30 minutes of the test (B). The patients tend to have a greater proportion of high blood sugar levels at 60 minutes than do the normal subjects. Above 140 mg.%, for example, there are 31% of the patients and 10% of the normal subjects. This level of blood sugar practically always differentiates "downward" from "upward" trends for in only 1 case of the 111 was there a reading above this point which was lower than the 30-minute value. In short, 60-minute blood sugar levels above 140 mg.% indicate "upward" trends in glucose tolerance. A further point to be noted is that 15 of the 91 patients (16.5%) had blood sugar readings above 160 mg.%. According to the standards of the Mayo Clinic (4) such values always indicate diabetes mellitus. It is obvious that there must be some

* We wish to express our appreciation to Lt.-Colonel Morton Brown and Lt.-Colonel Leon S. Medalia of the New Station Hospital, Fort Devens, Massachusetts, for their cooperation in securing the services of normal military controls.

** From the Memorial Foundation for Neuro-Endocrine Research and the Research Service of the Worcester State Hospital, Worcester, Massachusetts.

other explanation since these individuals are not diabetic as shown by normal fasting blood sugar levels and a lack of sugar in the urine.

In fig. 2 (B) are shown the frequency distributions for the changes in blood sugar from the 30 to the 60 minute reading. Where the latter value is the higher, it is considered on the plus side; where the former value is higher it is placed on the minus side. Here the weighting of the patients' upward trends is more clearly evident. Approximately one-third of the changes are greater than the highest upward normal trend. It is of course impossible with only 20 cases to delimit

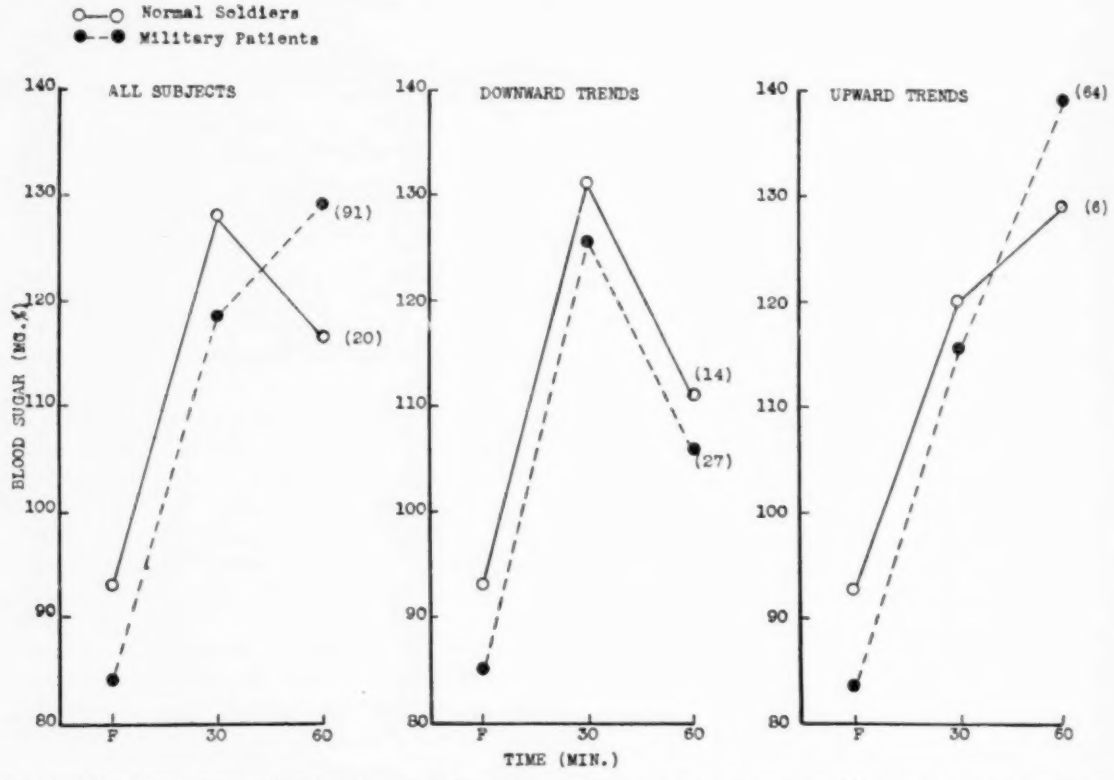

FIG. 1. Mean blood sugar values for the Exton-Rose glucose tolerance test in 20 normal soldiers and 91 military patients.

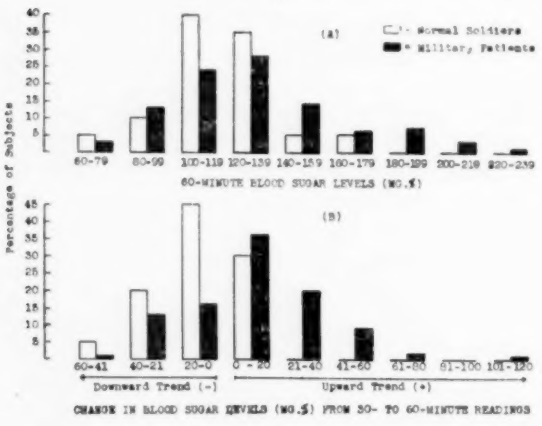

FIG. 2. Frequency distributions of (A) the 60-minute blood sugar levels, and (B) the differences between the 30- and 60-minute blood sugar readings in 20 normal subjects and 91 military patients during the Exton-Rose glucose tolerance test.

exactly the normal reaction to glucose. One can only say that the majority of normal subjects tend to have a decrease in blood sugar after the second dose of glucose. The reason for the upward trend in some of the normal subjects which apparently has occurred in other investigations (6) awaits further research.

The three readings obtained during the test reflect the general trend but mask the irregularities which frequently characterize the response to glucose. Figure 3 shows the blood sugar values for three subjects on whom the test was performed but from whom blood samples were obtained every 5 minutes throughout the hour. The three curves illustrate respectively a "downward" trend, a moderately "upward" trend and a marked "upward" trend. The increase in blood sugar after the first dose of glucose seems to begin within 10 minutes and may proceed upwards, at times irregularly, apparently reaching approximately its maximum value just before the 30-minute reading. The second

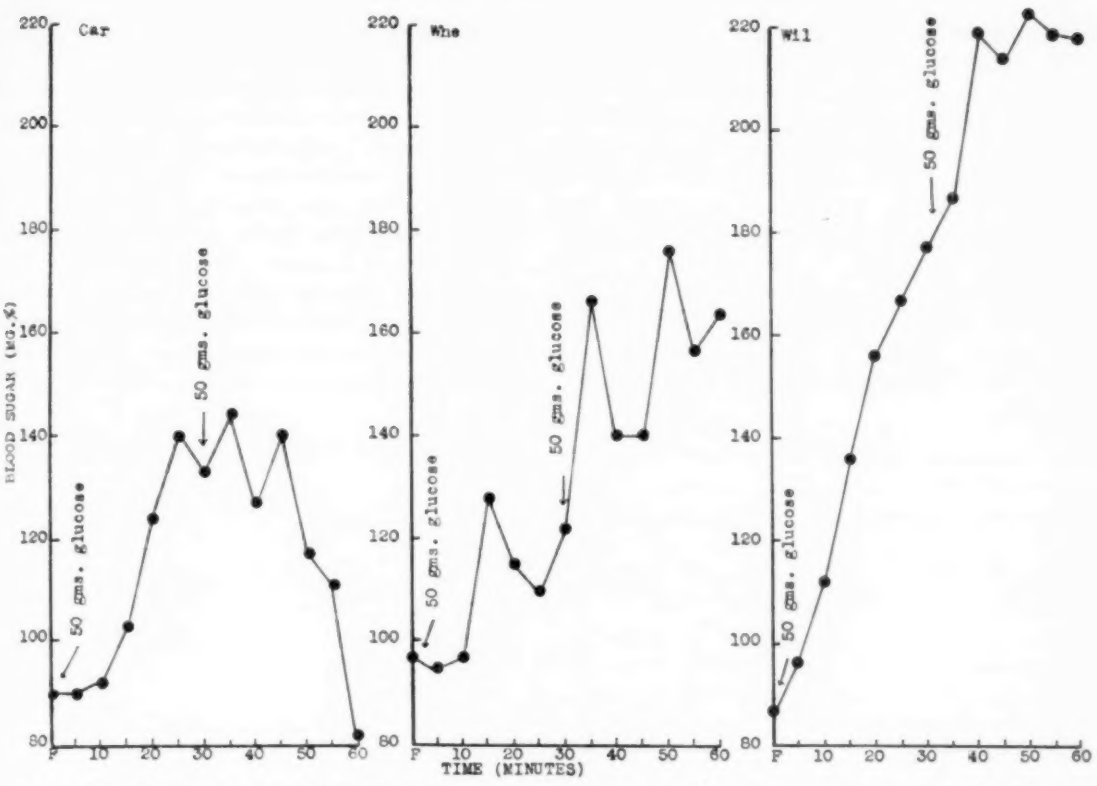

FIG. 3. The blood sugar values of the Exton-Rose glucose tolerance test taken at 5 minute intervals in 3 subjects.

dose of glucose may have no effect or may promptly elevate the blood sugar to a new level. One characteristic feature is that when a threshold value is reached there may be a marked fluctuation of the blood sugar so that the 30-minute and 60-minute values may be regarded as indicating only the general level of blood sugar. Slight differences in values between different individuals or on repeated tests within the same individual may be considered as mirroring this physiologic variation as well as the technical errors of the procedure.[1]

In order to determine the consistency of the procedure we have repeated the test on many patients at intervals of a week to several months. Figure 4 shows the results of repetitions in 6 patients. Five of the 6 show consistency in their general trends, in regard to the relationship between the 30-minute and 60-minute blood-sugar values. Duplication of blood-sugar values probably cannot be obtained in view of the innate variability of the individual. However, it would seem that on the whole, subjects who show an "upward" or "downward" trend at 60 minutes tend to remain consistent in this respect.

[1] Duplicate determinations of the blood sugar in 36 instances in values ranging from 140 to 270 mg. per cent showed an average error of 3 mg.

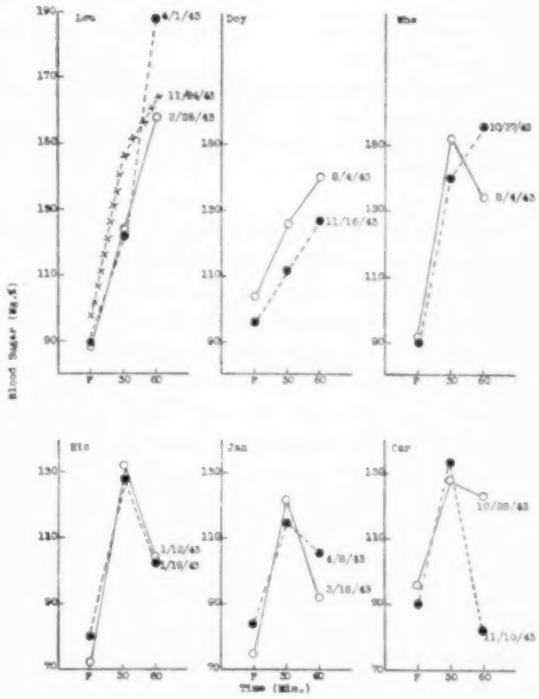

FIG. 4. Repeated Exton-Rose glucose tolerance tests in 6 subjects.

The physiological background for this abnormal type of reaction in blood sugar is as yet unknown. There is obviously some imbalance between the factors which raise blood sugar and those which drop it. So far as the latter are concerned we have studied the hypoglycemic reaction to insulin in 60 of the patients and have found that 42% show a lesser fall in blood sugar following the injection of insulin than do any of our normal controls (2). However, since, in individual patients no relationship between the blood sugar reaction to glucose and that to insulin could be detected, the abnormal elevation of the blood sugar level noted above does not seem to be due to a lack of sensitivity to insulin.

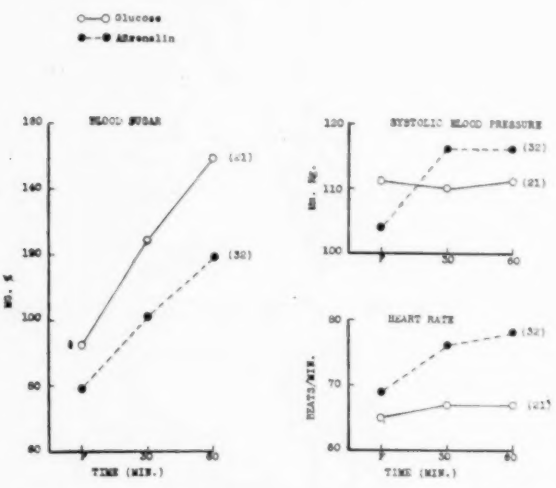

FIG. 5. Mean of blood sugar, blood pressure and heart rate of 21 subjects during the Exton-Rose procedure compared with the same variables following the intramuscular injection of adrenalin in 32 individuals.

So far as the blood sugar-raising principles are concerned we have considered the possibility that this reaction may be due to hyperadrenalinemia. In fig. 5 there is shown a comparison of the glycemic and cardiovascular effects of glucose with those following adrenalin. In 21 military patients on whom the Exton-Rose test was performed the mean blood sugar shows the trend characteristic of the larger group. Along with this sharp and continuous rise there is no change in blood pressure or pulse rate.

Let us contrast this with the mean trends seen in 32 schizophrenic patients to whom adrenalin alone was administered, intramuscularly, in doses of 0.01 cc. of a 1:1000 sol./kg. body weight immediately after the fasting blood sugar was obtained. The blood sugar increase is similar, though at a lower level, to that obtained by the administration of glucose. One would expect, therefore, if hyperadrenalinemia were the cause of the abnormal glucose tolerance that the fasting blood sugar levels would be much higher than they are. In addition, adrenalin characteristically increases the blood pressure and heart rate above the levels which ordinarily exist in these subjects.

A further exemplification of these differences is seen in fig. 6. Here are contrasted the effects of glucose alone and adrenalin (in the dosage mentioned above) plus glucose in 4 subjects. The adrenalin was injected immediately after the first 50 grams of glucose was ingested. In the blood sugar, adrenalin caused a marked intensification of the upward trend and an increase in blood pressure and pulse rate.

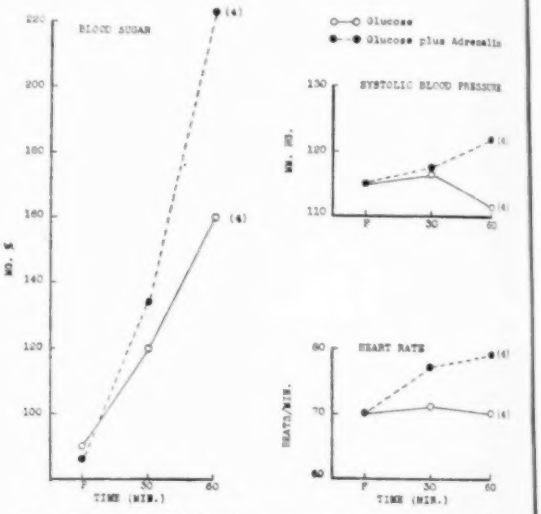

FIG. 6. Means of blood sugar, blood pressure and heart rate of 4 subjects following the ingestion of glucose (Exton-Rose technic), compared with the same variables following the ingestion of glucose plus the intramuscular injection of adrenalin.

Since, therefore, the elevations of blood sugar found with the Exton-Rose test do not show high fasting blood sugars or are not accompanied by increases in blood pressure or heart rate, they do not seem to be due to overactivity of the adrenomedullary mechanisms.

Since the elevations in blood sugar seemed to be associated in some instances with disturbances in the affective state of the subject, it was decided to investigate the effects of procedures which might alter the emotional state of the individual. Accordingly, in some subjects with high one-hour blood sugar levels, the test was repeated after the administration of sedatives. The drugs used were phenobarbital, sodium amytal by mouth and sodium amytal intravenously. The results were inconclusive. In some instances, the higher values were markedly decreased but in others no change was noted despite the fact that some of the subjects were obviously sleepy.

Our next step was an attempt to alter the blood sugar tolerance in the other direction by psychological methods. The technic used was to have the subject operate a "Pursuitmeter" (fig. 7) in which the task was to bring back to a given point a constantly moving light. In order to induce relatively high motivation the task was made to simulate the operation of the stick and foot-pedal controls of an airplane. The whole procedure lasted the hour during which the glucose tolerance test was carried out. During the performance, unpredictable and stressful stimuli such as noises, lights and air blasts were introduced at times when the subject was making an error in order further to increase the anxiety and tension normally called forth by the task. Physical fatigue was not an important factor since the controls were operated for intervals of only one minute separated by rest periods of 30 seconds. A control glucose tolerance test was performed either the day before or after the experiment.

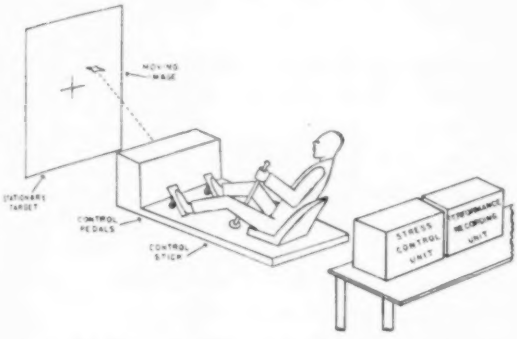

FIG. 7. Schematic diagram of the Pursuitmeter.

The results are shown in fig. 8. In 5 normal subjects and 6 patients, with "downward" blood sugar trends, the use of the pursuitmeter always elevated the one hour blood sugar value. In 2 subjects to whom glucose was not administered, the fasting blood sugar was not appreciably altered. This suggests (a) that the ingestion of glucose is necessary to activate the mechanisms involved in this reaction; and that (b) adrenalin is not an important factor since it always elevates fasting blood sugar (fig. 5). In 4 normal subjects and 8 patients with "upward" trends no consistent change was noted. It may be said, then, that in individuals with so-called "normal" blood sugar tolerances, the introduction of psychological tension may operate to alter the blood sugar values. In individuals with "abnormal" trends the procedure is not effective owing either to the fact that the process in these subjects may be nearer its physiological limit or that preoccupation

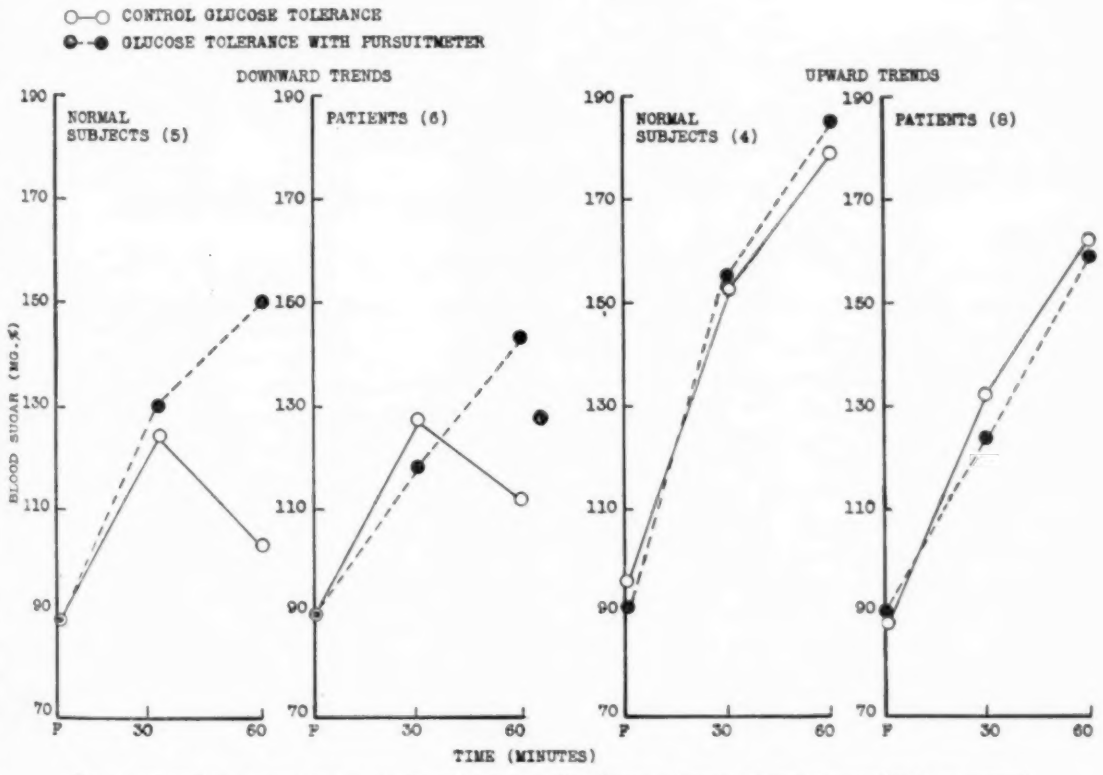

FIG. 8. The effect of working on the Pursuitmeter on the glucose tolerance (Exton-Rose technic) or normal and mentally disordered individuals.

with their problems may be sufficiently great to prevent disturbance due to a new task.

The glucose tolerance values were classified on the basis of the clinical diagnosis (Table 1). No particular difference was found between the mean values of the psychotic (66) and the non-psychotic (25) groups. In the psychoses, the 38 schizophrenic patients showed the same general trend as the 28 non-schizophrenic patients. The paranoid schizophrenic group, of whom there were only 7, showed in general a "downward" trend.

Of the non-psychotic subjects, the various groups showed the same general "upward" trend except for

TABLE 1

EXTON-ROSE GLUCOSE TOLERANCE TEST

MEAN VALUES OF DIAGNOSTIC GROUPS

Diagnosis	No.	Blood sugar		
		Fasting	30 min.	60 min.
		mg.	*mg.*	*mg.*
All Psychoses	66	83.8	117.4	129.7
Schizophrenia	38	82.4	118.8	126.7
Paranoid Schizophrenia	7	84.4	132.0	118.0
Non-Schizophrenia	28	84.5	115.6	134.2
All Non-Psychoses	25	84.3	122.2	128.6
All Psychoneuroses	14	86.3	123.5	131.1
Hysteria and Anxiety Neuroses	6	86.8	117.5	109.2
All Others	11	81.8	120.6	125.6
Normal Controls	20	93.0	128.0	116.6

6 subjects with hysteria or anxiety neurosis, in whom a "normal" type of sugar tolerance was observed.

It may be concluded, then, that the phenomena which influence glucose tolerance operate throughout the field of mental disturbance. The so-called "normal" values found in the two groups mentioned above, namely, paranoid schizophrenia and hysteria-anxiety neurosis, are of special theoretical interest though any conclusion must wait for confirmation by a larger population. The clinical status or behavior of the patient did not show any relationship to the type of glucose tolerance found but this may be due to the fact that the study was restricted to persons who would cooperate.

As a further follow-up of the possible psychological factors involved in the carbohydrate metabolism, analysis of the Rorschach results obtained on 69 of the 91 patients was made (Table 2). Of these 69 patients, 23 had exhibited a "downward" trend and 46 an "upward" trend. Both of these groups were heterogeneous with respect to psychiatric diagnosis.

Since there was a significant difference between the mean number of responses for each group ($P=.04$), and since the relationship between increased number of responses and the frequency of the various categories is not known, 20 cases from each group were selected so that the groups were equated for number of responses. (Of these, 10 cases were actually *paired* for number of responses.) In addition, the 10 extreme cases of upward trend and downward trend were compared.

Means for the Rorschach categories were computed for all these groups. Those categories whose means

TABLE 2

THE RORSCHACH TEST AND THE ORAL GLUCOSE TOLERANCE

		Sum C		M		Fc+F+FK%	
		Mean	P	Mean	P	Mean	P
Total Groups	N=46U	2.29	<.01	1.63	<.01	64.09	.04
	N=23D	.96		.48		73.61	
Matched Groups	N=20U	2.15	.059	1.40	.04	53.95	<.01
	N=20D	1.10		.55		70.90	
Extreme Groups	N=10U	3.30	.03	1.40	.052	56.00	.055
	N=10D	1.05		.20		70.40	

U = "Upward" trend in carbohydrate tolerance.
D = "Downward" trend in carbohydrate tolerance.

did not show sufficient difference by inspection were eliminated. The only ones which stood this inspectional test were: Sum C (weighted sum of color responses), M (human movement responses) and the Fc+F+FK% (pure form responses and form responses with the differentiated use of shading effects.) Table 2 summarizes these statistical results.

Using a P value of .05 as the limit of significance, it will be seen that except in the Sum C for the matched groups, and in M and Fc+F+FK% for the extreme groups, the differences between the means are all significant. The others are just on the borderline of significance, i.e., between .05 and .06.

Thus, the group with the "upward" trend have a greater number of responses, a higher Sum C, more M responses, and a lower Fc+F+FK%. According to Rorschach standards Sum C represents spontaneous responses to external stimulation; M represents spontaneous responses which are initiated by stimuli from

within; and the Fc+F+FK% represents the degree of control over spontaneous expression. These findings would imply that the group with the "upward" trend is in general more reactive and less constricted, i.e., not capable of as much control, as the group with the "downward" trend. Such results would be consistent with the hypothesis that the members of the group with the "upward" trend are either under more "tension" than the other group or are unable to control their emotional expression as much as the latter. In either case, it seems to be a group which is more responsive.

DISCUSSION

It would seem from the foregoing results that abnormal glucose tolerances are found in many more mentally disordered persons than in normal subjects. These unusual physiological trends appear to be influenced to some degree by psychological factors as is shown by the effects of a task arousing "tension" and by their relationship to certain findings in the Rorschach test. The endocrine factors behind these trends, presumably stimulated by the psychological processes are, as yet, unknown. However, the adrenomedullary secretion does not seem to be the important one involved. Whatever facts further research will disclose, the results of this study indicate the close association between physical and emotional factors in the organism.

SUMMARY

The Exton-Rose glucose tolerance test was performed on 20 normal soldiers and 91 military patients discharged because of psychiatric disorders. The patients showed a higher incidence of abnormal sugar tolerances (70%) than the normal subjects (30%). Excessive secretion of adrenalin did not seem to be a major factor in the causation of such trends. A relationship between high blood sugar level and psychological condition is suggested by certain Rorschach findings and by the alteration of the blood sugar level of subjects with normal trends by the introduction of a state of psychological stress.

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PERSONALITY ORGANIZATION AND ANOXIA TOLERANCE †

MAX HERTZMAN, JESSE ORLANSKY, AND CLIFFORD P. SEITZ *

I. THE PROBLEM AND THE LITERATURE

The ability to adjust adequately to oxygen deprivation is related to a variety of somatic and psychological factors (1). A considerable amount of research has been completed on the somatic aspects but relatively little material is available on the psychological correlates of good or poor anoxia tolerance.

In depriving an individual of his normal supply of oxygen we place him under physiological stress. This situation may also produce psychological stress. Emotional reactions may, moreover, influence the manner in which the individual makes use of his available oxygen and may thus influence the quality of his physiological adjustment. Among individuals receiving the same percentage of oxygen from the atmosphere they are breathing, some make the best use of what is received, while others, because of fear and anxiety, breathe in such manner as not to take full advantage of the available supply (38). Emotional reactions also involve concomitant changes in heart rate, blood pH, capillary flow, blood sugar, and tissue oxidation. In this way differences in emotional attitude aroused in a stress situation would make themselves felt in differential physiological stress.

Psychological factors as well enter to determine behavior under conditions of stress. It is not unlikely that individuals experiencing similar strains will differ from each other with respect to what they find tolerable. Thus anxious and emotionally disturbed people may collapse or become disrupted in the face of a physiological stress which will not prevent others from functioning. The problem in this case becomes one of de-

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termining differences in personality structure which enable some individuals to function with differential efficiency under conditions which make it difficult to maintain performance. The possibility arises that in a particular stress situation the individual behaves in a manner similar to his mode of behaving in other situations of stress or strain. Thus those more permanent patterns of the individual which constitute his personality can become significant indices of the nature of his reaction to stress situations.

It becomes of particular importance to examine the personality differences between individuals responding favorably as contrasted to those responding unfavorably to a given stress situation. Differences observed can be used for the purpose of exploring other stress situations in order to determine whether the patterning of the reactions of the subjects in various stress situations is consistently associated with differential personality patterns.

The major task of this investigation was to determine the relationship between personality structure and tolerance for anoxia. Particular emphasis was placed on differences in personality among individuals who tolerated anoxia well as contrasted with those whose reactions were poor.

The group Rorschach test was employed as our measure of personality.[1] Ideally, intensive case history material and a battery of tests, particularly of the projective type, would be most desirable. The conditions of the present study, however, precluded such intensive investigation of personality. Moreover, we are particularly interested in the diagnostic possibility of a test which can serve as an integrated measure of personality and which can be easily and quickly administered.[2] The questionnaire type of personality test has been shown by Fosberg (11, 12) to be much more easily manipulated by subjects than the Rorschach test to produce results giving a desired impression. In dealing with the testing of personal adjustment in the selection of aviation cadets, Bigelow (7) points out that in a situation that is so important to the candidate's future, cooperation with the examiner in dealing with negative aspects of the case history is rarely obtained. He warmly recommends the use of the Rorschach test under such conditions.

Previous research on the relation of personality structure to anoxia tolerance indicates that psychoneurotics experience greater difficulties than normal individuals at high altitude (28). Schneider (38) concluded from data collected during the first World War that physiological unfitness for flying was accompanied by definite psychoneurotic traits. He stated the possibility that the psychoneurotic might develop inadequate respiratory habits as a consequence of continued emotional stress. Henmon (17), also in connection with data obtained during the first World War, found some correlation between measures of emotional stability and flying ability. Although the correlations were low they were higher than the correlations with any of the other factors measured with the exception of mental alertness.

Specific evidence that normals and psychoneurotics adjust differentially to the reduction of the oxygen tension in the atmosphere, independent of other possible conditions incident to high altitudes, is presented by McFarland and Barach (28). Their psychoneurotic patients were more severely impaired than the normals under reduced oxygen tension.

> Approximately 70 per cent of them collapsed in an atmosphere of 10 per cent oxygen, whereas this occurred in only 14 per cent of the control subjects. Extreme variations in blood pressure took place previous to or accompanying collapse (28, p. 1339).

There have been very few investigations in which the Rorschach test was used in studying adjustment to reduced oxygen tension. Barach and Kagan (4) noted some adjustment changes in persons subjected to a simulated altitude of from 12,000 to 13,000 feet. Relationships between the personality structure of the subjects and their ability to tolerate anoxia, however, were not presented. Hertzman and Seitz (20) found differences between subjects who were able to tolerate a simulated altitude of 16,000 feet (11.24% oxygen)[3] and those who were not. General personality ratings based on the Rorschach protocols indicated a greater maladjustment on the part of those subjects who experienced the most extreme difficulties at reduced oxygen tension than among the rest of the subjects. There was a greater tendency toward neurotic patterning in the group reacting poorly to anoxia than in subjects responding more adequately. The groups were too small to warrant study of differences in more specific patterns.

Under actual conditions of selection, it is necessary to differentiate among various normal individuals as well as between normal and pathological individuals. Many who will experience extreme difficulty under reduced oxygen tension or other conditions of physi-

[1] Since the Rorschach test is the only measure of personality employed in this study, the term "personality organization" when used is a statement of the Rorschach findings.

[2] Depending on the physical conditions under which the slides are projected and the personnel of the group tested, the group Rorschach test may be administered in time periods ranging from 40 to 60 minutes and to groups as large as 100 people (16, 18, 24, 39).

[3] Corrected for water vapor tension the altitude would more nearly approximate 15,000 ft.

logical and psychological stress can hardly be considered as psychoneurotic. In all probability their emotional organization differs in some respects from those who can make adequate adjustment to these conditions.

The chief problem of the present paper, then, is to find whether there are differences in personality patterning, as indicated by the Rorschach test, between persons who can adjust adequately to severe conditions of anoxia and those who cannot adjust adequately. The particular value of this research lies in the possibility of describing differentiating personality patterns with respect to our stress conditions in a sample of subjects taken in the *normal range*.

II. PROCEDURE

1. *Selection of Subjects*

The subjects were 40 male college students who were in attendance at the College of the City of New York at the time that the experiments were conducted. Each subject was given a physical examination before being accepted.[4] Special emphasis was placed on heart and lung conditions. Students with histories of illness in these areas were not utilized even if they were in good health at the time of our examination. A physician was present in the chamber during all of the experimental runs and administered to those of our subjects who experienced excessive distress.

The subjects are particularly appropriate in view of their similarity in age and educational background to aviation cadets. The median age was 19 years and 7 months with an interquartile range of 15 months.

2. *Experimental Procedure*

The group Rorschach test was administered to each subject in the City College nitrogen dilution chamber both at sea level and at a simulated altitude of 18,500 feet (9.3% oxygen).[5] The temperature, humidity and concentration of carbon dioxide were held within comfortable limits. The temperature was maintained at 70° Fahrenheit, the humidity at 58% and the carbon dioxide never exceeded .6%.

Twelve groups of three subjects each and two groups of two subjects each were employed. Half of the subjects took their first test under sea level conditions (control) and the second test at the simulated altitude of 18,500 feet (9.3% oxygen). The procedure was reversed for the remaining half of the subjects. A period of two weeks intervened between the two tests for 32 of the subjects and the interval varied from 10 to 12 days for the remaining 8 subjects.

a. *Experimental Session.* Subjects were taken into the chamber in the company of the physician and at least one of the experimenters. The experimenter and the physician donned oxygen masks when the ascent began, which took 17 minutes. Fifteen minutes later the group Rorschach test was administered, the slides being projected from the outside of the chamber upon a translucent screen attached to one of the chamber windows. Each of the ten slides was projected for three minutes. The only interruptions to the continuity of the test were two brief periods of from one to two minutes each during which pulse records were taken of each subject. Thus the subjects were deprived of a normal oxygen supply, to some degree, for a period of 64 to 66 minutes and were at maximum deprivation for the experiment for a period of 47 to 49 minutes.

A series of pulse readings was taken in the following sequence: (1) Before entering the chamber, (2) immediately after the heavy chamber door closed behind the subjects, (3) at the time the ascent had ceased and the maximum simulated altitude had been reached. The fourth, fifth and sixth measures were taken after the subjects had responded to the third, sixth and tenth slides, respectively. The same sequence of readings was taken during the control session.

Variations in patterns of pulse readings at the simulated altitude were used as one of the criteria for judging anoxia tolerance.

b. *Control Session.* The control sessions were made to appear as much like the experimental sessions as was possible. The same sequence of pulse readings was used, the experimenter and the physician donned oxygen masks and compressed air was permitted to escape into the chamber so that the noise of gas entering the chamber could be heard by the subjects. It was soon found that in those cases where the experimental session preceded the control session these precautions were unnecessary. The altitude conditions were severe enough to affect all the subjects in some manner. Those who had experienced the altitude effect, in most instances, recognized the sea level session as such. In the latter stages of the experiment, therefore, the attempt to simulate experimental conditions during the control run, for those subjects having the "experimental-control" sequence was abandoned.

The great majority of subjects going through the control-experimental sequence realized when they were at sea level even though they had not yet experienced the altitude conditions. Attempts to simulate experimental conditions during the control run were, however, maintained for this sequence.

[4] The authors take great pleasure in expressing their gratitude to Dr. George Recht for his medical supervision of the subjects.

[5] 9.3% oxygen at atmospheric pressure, corrected for water vapor tension, is equivalent to an altitude of 18,500 feet.

c. *The Administration of the Group Rorschach Test.* Group Rorschach slides prepared under the direction of Harrower-Erickson (16) for kodascope projection were used. They were projected from outside the chamber to a screen on one of the chamber's windows. Each slide was projected for 3 minutes. The only interruptions in the sequence of the slides were the brief intervals taken for pulse readings after slides three and six had been responded to.

After all the slides had been administered and the last pulse reading was taken, the chamber door was opened and the subjects were given a few minutes to relax. The inquiry for each slide was then conducted, in all cases, at sea level atmospheric conditions. Approximately two minutes per slide were allowed. A "minimal" inquiry was given (18), the subjects being instructed to number and outline what they saw in the slides and to explain what it was about the slides that contributed to their concepts. In addition they were asked to elaborate on sketchily described concepts.

As the subjects handed in their test blanks, the experimenter read through them rapidly and asked questions in relation to critical responses for which the scoring would have been in doubt. This procedure corresponds to what has been elsewhere called the tutorial inquiry (24). This additional inquiry required no more than two minutes in the majority of the cases.

d. *Measures Employed.* (1) Rating for anoxia tolerance. An over-all rating of tolerance for stress produced by oxygen deprivation was given each subject immediately after his experimental session had been terminated. The rating was based on his pattern of pulse changes, on the development and degree of cyanosis exhibited, the degree of fatigue and strain shown by the subject and the nature of spontaneous remarks that were made and behavior that was exhibited. The ratings were made by one of the experimenters, thoroughly familiar with the variability of reactions to high altitude and with wide experience in assessing their import. A nine-point scale was used with one representing the least adjustment and nine the maximum adjustment to our conditions of stress. In employing the scale the judge used the ratings of one to four for those subjects whose adjustment he classified as being definitely poor. The ratings of six to nine were used for those subjects who, he was certain, were making adequate adjustments. Five was reserved for those subjects who could not be classified definitely as making either poor or adequate adjustments.

(2) Rorschach measures. Some of the Rorschach measures used will be described more fully in the section on results, as their significance will be clearer in the light of the general pattern of results.

1. Ratio of the number of human movement responses to the sum of color. The human movement responses are an important index of the extent and organization of the inner resources of the individual. The color responses contribute to an understanding of the organization of the individual's emotional life in relation to himself and others. Five patterns of interrelationship between these two indices were developed by Rorschach (36). These have been modified slightly by us to give four groupings in to one of which each of our subjects could be placed.

2. Rorschach signs. Various Rorschach measures are indicative of different aspects of personality organization. Such measures have been called "signs." Although they cannot substitute for an over-all consideration of the total personality, they frequently furnish leads for diagnosis and understanding. Research in the past few years has indicated their value for the diagnosis of psychoneurosis (29, 15), schizophrenia (22), for estimating the probable outcome of therapy (33), and for predicting scholastic (31) and job adjustment (34).

The Rorschach records of our subjects were analyzed for the presence or absence of various signs. Six signs were found to be of value in discriminating those with good adjustment to oxygen deprivation from those with poor adjustment.

3. Personal adjustment ratings. In order to obtain a measure of the total picture presented by the Rorschach data, over-all ratings for adjustment were made. A scale similar to the anoxia tolerance scale was used. Those whose adjustment (on the basis of their Rorschach records) was considered to be definitely poor were rated from one to four. Those whose adjustment was considered good were rated from six to nine and the doubtful cases were rated five. The ratings were made by two judges whose original ratings correlated .92 with each other. Neither judge knew the anoxia tolerance rating of the subject at the time that his rating was made. In those instances where the ratings of the two judges were not the same, a common rating was decided on after a conference on the individual record in question.

III. RESULTS

All the Rorschach data which have been related to different degrees of anoxia tolerance are taken from the records of the subjects obtained under sea level conditions. The scoring system employed is the refined Rorschach scoring presented by Klopfer and Kelley (23).

1. *Relation of Anoxia Tolerance to Basic Personality Constellation*

Rorschach distinguished five personality groupings which were defined primarily by the relationship be-

tween the number of human movement responses and the sum of the color responses.[6]

a. *Coartated Group.* Individuals with no human movement or color responses. Such individuals are extremely constricted in their behavior and emotions. Anxiety is very strong. They are unable to draw effectively on their own resources and cannot participate with ease and in an adjusted manner to external stimulation. Rigidity of behavior is very likely to occur in such individuals.

b. *Coartative Group.* Such individuals are very similar to the previously mentioned group, although not as extreme. On the Rorschach test they have some human movement or some color responses. For purposes of this study the two groups referred to have been merged and designated as the "coartative" group. Individuals were included in this group if they had no more than two human movement responses and no more than one color response. Individuals with two human movement responses were included because, for a college student population, this number is very low (18, 19). Eight of our forty subjects were included in the coartative group.

c. *Introversive Group.* Individuals in this group are predominantly influenced by stimulation arising from within themselves. In the Rorschach test they have more human movement responses than color responses. Among adolescents it is not unusual to have no color responses at all (18, 35). Individuals in this group may develop a strong inner stability. Subjects were classified as belonging in this group if they gave three or more human movement responses and if the number of their human movement responses was about double or more than double their sum of color. Twenty of the subjects were classified as belonging in this group.

d. *Extratensive Group.* The individuals in this group are influenced predominantly by stimuli external to them. In the Rorschach test the sum of their color responses outweighs the number of their human movement responses. Rorschach included individuals whose sum of color was at least twice the number of their human movement responses in this group. We have included some individuals in this group who do not have so great a ratio between their movement and color responses but whose color responses are very numerous and clearly exceed the number of their human movement responses. No individual in this group had a sum of color of less than 3.5 or more than 4 human movement responses. Six subjects are included in this group.

[6] The sum of the color responses is not the same as the number of color responses as the three different kinds of color responses are weighted differently in obtaining the sum.

e. *Ambiequal Group.* Individuals in this group are presumably equally responsive to internal promptings and the demands of the outside world. Theoretically, people with such a personality pattern have the basis for a highly integrative adjustment pattern. The number of human movement responses and the sum of color is about equal in the members of this group. There are six subjects in this group. Those individuals whose human movement and sum of color scores are equal to each other but very low are, of course, not included in this group but belong in the coartative group.

Classification of most of our subjects into one of the four groups we employed was simple and could be done without reservation. Borderline individuals offered difficulty but they were too few in number to affect the general trend of results reported below.

In Table I the average rating for anoxia tolerance and for general personal adjustment based on the consideration of the total Rorschach record for each of the four groups of subjects is presented. *The coartative group responds more inadequately than any of the others to the conditions of stress presented in the experiment, with an average tolerance rating of 4.0. The extratensive group, although superior to the coartative, is below the ambiequal and introversive groups, which are about equal to each other.* When the two poorest groups are merged and compared to the average of the two superior groups, the averages become 4.4 and 6.1 respectively. The difference between these groups is significant at less than the one per cent level (9). Differences between over-all measures of personal adjustment are even more marked. The coartative group is lowest with an average rating of 2.6 and the ambiequal group highest with an average of 7.0. The average of the coartative and extratensive groups, merged, is 3.5, compared to an average of 6.5 of the ambiequal and introversive subjects. The difference between these two means is significant at less than the one per cent level.

The treatment of these data by averaging group tendencies gives a general picture of the results. The results can be explored further by analyzing the data with the individual as the point of departure. We indicated in the procedure that ratings for anoxia tolerance of 4 or less were given by the experimenter when he was certain that the reactions of the subject to the stress conditions were poor, and ratings of 6 or higher were given when he was certain that the reactions were good. Accordingly, the subjects have been divided into those who were rated from 1 to 4 and those who were rated 6 or higher. There are 12 subjects in the former and 24 in the latter group, with 4 falling into the doubtful class. The coartative, extratensive, ambiequal

and introversive groups have been compared with respect to the relative inclusion of their members in the two rating groups thus formed. A similar comparison has been made with respect to the ratings for personal adjustment. The distribution of the subjects in the various groups is to be found in Table 2.

The same order is shown as in Table 1. Only 19 per cent of those classified as introversive or ambiequal are rated poor with respect to anoxia tolerance as contrasted to 57 per cent for the combined coartative and extratensive subjects. On the other hand, 73 per cent of the introversive and ambiequal groups are rated high for anoxia tolerance as contrasted to 29 per cent for the subjects in the coartative and extratensive groupings. The distribution of ratings for the contrasted sets of subjects differ significantly from each other.

The foregoing analysis has shown that a significant relationship exists between a critical Rorschach constellation in the responses of our subjects and tolerance for high altitude stress. *Individuals who are rigid, anxious, not very dependent on themselves and inhibited in their responses react poorly to the high altitude situation. Individuals who are outgoing but do not have sufficient inner balance also experience difficulties, although not to the same degree as the highly inhibited group. Individuals well integrated with respect to the use of their inner resources and responsive to external stimulation react best of all.* Those whose acceptance of external stimulation is not on a high level nevertheless respond adequately if they can accept stimulation from themselves. We may expect other measures which elaborate the significance of the constellation studied also to be indicative of significant relationships.

TABLE 1

AVERAGE RATING FOR ANOXIA TOLERANCE AND GENERAL PERSONALITY ADJUSTMENT OF INDIVIDUALS HAVING DIFFERENT HUMAN MOVEMENT-COLOR RATIOS

Type of constellation	N	Range of human movement responses	Range of sum of color responses	Average rating for anoxia tolerance	Average rating for general personality adjustment
Coartative	8	0– 2	0 –1.5	4.0	2.6
Ambiequal	6	2– 4	1.5–3.5	6.0	7.0
Introversive	20	3–10	0 –4.0	6.1	6.4
Extratensive	6	1– 4	3.5–6.0	5.0	4.7
Coartative plus extratensive	14	—	—	4.4	3.5
Ambiequal plus introversive	26	—	—	6.1	6.5

TABLE 2

PER CENT OF INDIVIDUALS RATED SIX OR HIGHER AND FOUR OR LOWER FOR ANOXIA TOLERANCE AND FOR GENERAL PERSONALITY ADJUSTMENT IN EACH HUMAN MOVEMENT-COLOR CONSTELLATION

	Rating for anoxia tolerance		Rating for general personality adjustment	
Type of constellation	Per cent rated 6 or higher	Per cent rated 4 or lower	Per cent rated 6 or higher	Per cent rated 4 or lower
Coartative	25	63	0	100
Ambiequal	83	17	83	0
Introversive	70	20	70	5
Extratensive	33	50	17	50
Coartative plus extratensive	29	57	7	79
Ambiequal plus introversive	73	19	73	4

2. *Relation of Anoxia Tolerance to "Psychoneurotic" Structure*

a. *Selection of Signs.* Many Rorschach scores are indicative of significant relationships in the personality. A considerable amount of research has been published recently in which the development and employment of critical scores as "signs" of various conditions have been presented. When a diagnosis is made in which signs are used the presence of isolated signs is not generally regarded as significant but the presence of patterns of signs may be highly differentiating.

In this study the sign approach was applied in the following manner: Rorschach responses which had been shown in the past to distinguish individuals of

different degrees of stability were studied in relation to the different degrees of anoxia tolerance exhibited by our subjects. Subjects who were rated 6 or higher were contrasted with those rated 4 or less. The nature of the signs that were tried was, of course, limited by the fact that our subjects are a relatively normal group. Thus we could not expect as sharp differentiation between our "good" and "poor" subjects as, let us say, between a normal group and a group of institutionalized neurotic patients.

Of the eleven measures studied six were retained as being diagnostic of anoxia tolerance and five were eliminated. Five of the six retained have been found to distinguish normal subjects from institutionalized neurotics (29, 15). The six measures retained were as follows:

(1) The number of human movement responses equal to zero or one. This represents a small number of human movement responses as compared to the average. It would indicate that the individual has very few resources which he can muster as a bulwark to withstand stress.

The measure would obviously include a great many who were classified as coartative. It could include none who were classified ambiequal or introvertive. It could include extratensive individuals.

(2) Color shock. Disturbances created in the individual when responding to the color cards. There are many indices of such disturbances (8) but the different varieties were not distinguished in this study. This behavior is found to a marked degree in neurotics. It indicates some degree of personality disorganization in the face of pressing emotional situations. The recovery or lack of recovery of the individual from color shock is a measure of the degree of his disturbance. In a sense, the absence of the other factors listed here in an individual's record could be an index of recovery and an indirect sign of a disturbance which could be dealt with by him.

(3) Shading shock. Disturbance created in the individual when responding to the heavily shaded cards. Strong shading shock may indicate deep-seated underlying anxieties in the individual.

(4) Refusal or inability to respond to a card. While this occurs frequently in children because of paucity of ideas, when it occurs in well educated adults or late adolescents it is very likely an indication of emotional blocking.

(5) No form color responses. The form color responses are indications of mature emotional control. The absence of form color responses is generally an index of failure on the part of the individual to integrate his needs with external stimulation. One may expect to find a substantial percentage of individuals without form color responses in college students (18, 35).

(6) Negative color balance. This measure is obtained by subtracting the number of color form and pure color responses from the number of form color responses in each individual's record. If the number of form color responses is less than the remaining color responses this measure, which we designated as "color balance," would have a negative sign. Negative color balance is an indication of a preponderance of immature over mature ways of coping with emotional problems. There is a tendency for uncontrolled emotional expression.

TABLE 3

DISTRIBUTION OF SIX CRITICAL RORSCHACH SIGNS IN THE LOW AND HIGH ANOXIA TOLERANCE GROUPS

	Range of anoxia tolerance rating for each group	Color shock	Shading shock	Refusal	Human movement = zero or one	Form color = zero	Color balance
Number of individuals having each sign	1–4 (N=12)	5	4	2	4	5	3
	6–8 (N=24)	4	0	0	1	5	3
Per cent of individuals having each sign	1–4	41	33	17	33	41	25
	6–8	17	0	0	4	21	13
Difference	—	24	33	17	29	20	12

The distribution of the six signs for the subjects whose anoxia tolerance score was high and for those whose score was low is presented in Table 3. Two of the signs, shading shock and refusal, are not to be found among the members of the good group, and only one member of that group has the human movement sign. The three remaining signs, while they occur in the good group, occur more frequently in the poor group. Color balance is the least differentiating of the three.

Although refusal occurred so infrequently, it is so

rare in the group Rorschach when applied to college students (18, 32) that it was retained as a sign since it occurred only in subjects with poor anoxia tolerance. The remaining signs which were studied and which did not differentiate the two groups were (a) absence of color responses of any kind, (b) high animal per cent (50% or greater), (c) high form per cent (50% or greater), (d) disturbances in the manner of approach, (e) the presence of diffusive shading responses. While these five signs did not occur with relatively greater frequency in one group than the other, their presence will influence the total rating given to an individual. Their significance with respect to personal adjustment varies as a function of their relation to other aspects of the Rorschach record.

one sign, while more than half of those in the low tolerance group have two or more signs.

The patterning of signs as shown in Table 4 is of particular interest. The three signs which least differentiated the good from the poor group occur in *isolation* only in the high tolerance group. They are significant of inadequate personality structure in combination with other signs but not when they exist alone. Thus every subject who has only the color shock sign or the form color sign, or the color balance sign, is in the high tolerance group.

This implies that a subject in the low tolerance group, if he has the less differentiating signs, has at least two of them.

Most impressive of all is the fact that of the twenty-four subjects in the high tolerance group only one has one of the more significant signs.

TABLE 4

DISTRIBUTION OF PATTERNS OF CRITICAL SIGNS IN THE LOW AND HIGH ANOXIA TOLERANCE GROUPS

Type of pattern	Number in low tolerance group	Number in high tolerance group	Per cent in low tolerance group	Per cent in high tolerance group
No signs	3	11	25	46
1 sign	2	13	17	54
Color shock	0	4		
Shading shock	1	0		
Movement	1	1		
Form color	0	5		
Color balance	0	3		
2 signs	3	0	25	0
Color shock and shading shock	1	0		
Form color and color balance	2	0		
3 to 5 signs	4	0	33	0
Color shock, movement, form color	1	0		
Color shock, refusal, form color	1	0		
Color shock, shac'ing shock, refusal, movement	1	0		
Color shock, shading shock, movement, form color, color balance	1	0		

b. *Sign Patterning in Relation to Anoxia Tolerance.* The patterns of sign relationships found in both the high and low group is presented in Table 4. In Table 5, the distribution giving the per cent of individuals having zero or one sign, and the per cent having two or more signs in each of the two anoxia tolerance groups is presented. *It is clear from Table 5 that no individual in the high tolerance group has more than*

TABLE 5

DISTRIBUTION OF PER CENT OF SUBJECTS IN THE TWO ANOXIA TOLERANCE GROUPS WITH NONE OR ONE CRITICAL SIGN AND WITH TWO OR MORE CRITICAL SIGNS

	0 or 1 sign	2 or more signs
Low tolerance group	41	59
High tolerance group	100	0

Three subjects out of twelve in the low tolerance group have no signs at all. Of these, without knowledge of their anoxia tolerance score, two were rated 5 on the total Rorschach and one was rated 7.

These results indicate that for our sample a significant relationship exists between the kind of sign or the pattern of signs that are found in an individual's Rorschach test protocols and his ability to tolerate anoxia. The bulk of our subjects who are unable to tolerate anoxia have clear patterns which may be described as (a) deep anxiety, or (b) difficulty in applying their own resources, or (c) anxiety and obvious emotional disturbances in ordinary life situations, or (d) inadequate responsiveness to the external world in relation to their inner needs, or (e) difficulty in

applying their own resources linked with easily observed disturbances in ordinary life situations, or (f) extreme pictures of anxiety, lack of rapport with the outside world and inability to assemble one's own resources. All of these patterns are in a neurotic direction, although it is doubtful whether more than 2 or 3 of the 40 subjects could legitimately be classified as psychoneurotic.

3. *Relation of Anoxia Tolerance to Ratings of Personal Adjustment Based on the Total Rorschach Test*

As indicated in the procedure, over-all ratings for adjustment based on the total Rorschach record were made. These ratings, as will be shown below, are discriminating. There are a number of difficulties, however, in obtaining these ratings which reduce their value as contrasted with the sign approach presented in the previous section. The balancing of positive and negative factors in the total record increases the frequency of the 5, or doubtful, rating. The ratings are based on general considerations and are not made mainly with respect to those factors which are most differentiating in the anoxia situation.

TABLE 6

PER CENT OF INDIVIDUALS IN THE LOW AND HIGH ANOXIA TOLERANCE GROUPS PLACED IN DIFFERENT PERSONAL ADJUSTMENT GROUPS

	Per cent rated 6 or higher	Per cent rated 4 or lower	Per cent rated 5
Low tolerance group	8	58	33
High tolerance group	71	17	12

The mean ratings of individuals with low tolerance is 3.8 and the mean rating of those with high tolerance is 6.5. The difference between the means of 2.7 is significant at less than the one per cent level. In Table 6 the data are presented with the 5 rating eliminated. For the subjects that remain, the contrast between the distributions for the low and high groups is great. But too many of the subjects are eliminated by this procedure for it to be of as much practical value as the preceding results on sign patterns.

4. *The Predictive Value of the Three Methods of Organizing the Rorschach Data*

A simple way of comparing the effectiveness of each of our different approaches is to set up critical scores for each of them and place our subjects into the high or low tolerance group on the basis of these scores. A comparison can then be made between the percentages of individuals correctly placed and the percentage that would be placed correctly by chance.

The following critical scores were set up: (a) For the constellations determined from the human movement to the sum of color ratio (1) subjects classified as ambiequal and introversive were placed in the high group: (2) subjects classified as coartative and extratensive in the low group.

Two patterns of critical scores were set up for the signs:

(b1) (1) Subjects with one or no signs were placed in the high group: (2) subjects with 2 or more signs were placed in the low group.

(b2) (1) Subjects with one or no signs, except those subjects with the movement or shading shock sign, in the high group: (2) subjects with 2 or more signs and those with one sign, if it was the human movement or shading shock sign, in the low group.

(c) Although a rating of 5 for personal adjustment was given by the raters for those subjects whom they could not include either in the poorly adjusted or well adjusted groups, it was felt that these values should be included in order to make a more complete test of the efficiency of the personality ratings. Twenty per cent of the subjects were given a rating of 5. It was felt that the elimination of these subjects would have reduced the sample too drastically. The rating of 5 was included in the upper group which made the distribution for the anoxia tolerance groupings comparable to the distribution of the adjustment groupings. By this division eleven of the subjects are included in the low adjustment group as compared to twelve being included in the low tolerance group, and twenty-five are included in the high adjustment group as compared to twenty-four in the high tolerance group.

The number of correct matchings that can be expected by chance for each of these sets of scores and the number of correct matches made when using the various criteria are presented in Table 7. All methods employed enable us to place a greater number of subjects in their proper groups than could be done by chance matchings. Chi-square was calculated for the relationship between the distributions determined through the use of our different criteria and chance expectancy. Yates' (14)[7] correction for small samples was employed. When comparison is by critical scores the ratings give the least significant results, being significant at the four per cent level. All the remaining breakdowns are significant at below the one per cent level. The breakdowns dependent on the sign systems are each significant at less than one-tenth of one per cent (10).

[7] The data in Table 7 represent only two of the four cells. The remaining two cells, representing those instances wherein subjects belonging in the high group were placed in the low group and vice versa were, of course, employed in calculating the chi-square value.

In numerical terms some of these results are impressive. *Our most effective system for allocating the various subjects results in a correct placement of 32 of the entire 36 who were considered. Our least effective method enables us to place 27 subjects correctly.*

The relative effectiveness of the different methods with respect to placing individuals correctly in the high as compared with the low tolerance group is shown in Table 8. In this table the number of individuals correctly placed in each class divided by the total number of those who belong in the category according to the anoxia ratings is presented.

It should be noted that each method predicts the successes more adequately than it does the failures. The two sign methods are extraordinarily high with respect to successes, correctly predicting the placement of 100 per cent and 96 per cent of our subjects. By our methods of prediction a number of individuals with poor tolerance would be classified as being satisfactory, but very few who are good tolerators of anoxia would be classified as inadequate. This would suggest that for some of our subjects inadequate reaction to oxygen deprivation has essentially a somatic rather than a psychosomatic basis and might be correlated with various physical and physiologic factors not considered by us in admitting the subject to the experiment. A careful analysis of the physical characteristics of subjects with adequate personality structures but divided with respect to their reactions to conditions of anoxia would be of great value.

The measures that have been employed, although different from each other, are highly interrelated. We were thus unable to devise combinations employing the constellation, signs and ratings of each individual as a group in a manner which would yield better prediction than our most effective criterion. In Table 9 the relation between our constellation measures, sign measures and personality ratings are presented. When the constellations are arranged in the order of coartative, extratensive, introvertive and ambiequal, we have a very consistent reduction in the average number of signs of from 2.3 per subject in the coartative group to 3.0 per subject in the ambiequal and an increase in over-all rating that runs from 2.6 for the coartative group to 7.0 for the ambiequal group.

In attempting to combine our different patterns the placement of each individual determined from his particular constellation, the personality rating and the

TABLE 7

DIFFERENCES BETWEEN RANDOM PLACEMENT IN THE TWO ANOXIA TOLERANCE GROUPS AND PLACEMENT THROUGH THE USE OF THE VARIOUS RORSCHACH CRITERIA

Criteria used in placing subjects		Subjects correctly placed in high tolerance group		Subjects correctly placed in low tolerance group		Subjects placed correctly in both groups	
		N	%	N	%	N	%
(a) Ratio between human movement and sum of color (constellations)	Expected by random matching	16	44	4	11	20	56
	Obtained	20	56	8	22	28	78
	Difference	4	12	4	11	8	22
(b1) Signs	Expected	19.3	53	2.3	6	21.6	60
	Obtained	24.0	67	7.0	19	31.0	86
	Difference	4.7	14	4.7	13	9.4	26
(b2) Signs	Expected	17.3	48	3.3	9	20.6	57
	Obtained	23.0	64	9.0	25	32.0	89
	Difference	5.7	16	5.7	16	11.4	32
(c) General personality adjustment ratings	Expected	16.7	46	3.7	10	20.4	56
	Obtained	20.0	56	7.0	19	27.0	75
	Difference	3.3	10	3.3	9	6.6	19

TABLE 8

RELATIVE DEGREE OF CORRECTNESS WITH WHICH INDIVIDUALS ARE JUDGED TO BE IN EITHER ANOXIA TOLERANCE GROUP ON THE BASIS OF THE VARIOUS RORSCHACH CRITERIA

Criteria	Ratio of individuals correctly placed in high group divided by number belonging in high group (in %)	Ratio of individuals correctly placed in low group divided by number belonging in low group (in %)
Constellation	80	67
First sign method	100	58
Second sign method	96	75
Rating for personal adjustment	80	58

more effective sign system were examined. For 28 of the 36 subjects these three measures were in agreement. For the remaining 8 subjects the following situation held: The rating was correct (when the actual placement of the subject in either of the two anoxia groups was used as a criterion) in only one case, the constellation in two cases and the signs in 6 out of the total 8 instances. In 7 out of the 8 cases the measure in the minority was correct. This measure was generally the sign measure and is a further index of the superiority of this measure in this particular problem.

TABLE 9

AVERAGE NUMBER OF CRITICAL SIGNS AND AVERAGE PERSONALITY RATING FOR THE DIFFERENT HUMAN MOVEMENT-COLOR CONSTELLATIONS

Type of constellation	Average number of signs	Average personality rating
Coartative	2.3	2.6
Extratensive	1.3	4.7
Introversive	0.6	6.4
Ambiequal	0.3	7.0

3. *Rorschach Changes at High Altitude*

Since the Rorschach test was given at both sea level and high altitude conditions, differences between the two sets of protocols can be evaluated. Studies of this nature are of great theoretical importance with respect to many Rorschach and psychosomatic problems. Kelley and Barrera (21), for instance, in their study of the effects of alcohol as demonstrated by Rorschach test changes, were able to identify different forms of adjustment to alcohol as well as to verify some of the interpretations of the significance of the form responses in the Rorschach test. We hope to present our data on change more thoroughly later. Our main interest in the present paper centers about the problem of selection.

These facts, however, stand out: (1) Many more subjects produced fewer movement responses under reduced oxygen tension than increased their output of human movement responses. (2) Anoxia tends to reduce the number of form color responses and increase the number of color form and pure color responses. This is indicative of decreased emotional control under increased oxygen tension and is thoroughly consistent with other studies of high altitude effects where different indices have been used [26, 27]. (3) The differences in the Rorschach protocols were more marked when the test under altitude conditions was administered first than when the test under sea level conditions was administered first. This would suggest that if one wishes to study the full impact of anoxia on an individual's Rorschach productions it would be better to obtain the initial Rorschach test under altitude conditions.

The general results listed above verify the findings previously reported by us (20) on a smaller group of subjects who were given the individual and not the group Rorschach test.

IV. DISCUSSION

1. *The Major Findings*

The major results of the present study indicate that groups of individuals in good physical health but differing with respect to their ability to tolerate anoxia may be distinguished from each other on the basis of differences in personality organization. Specific patterns have been determined from Rorschach test data that have discriminative value, at least for male college students.[8]

The general tenor of our results is consistent with the previous findings that psychoneurotics tolerate anoxia less adequately than normal people (28). But it is important to note that we could hardly conclude that our group of poor tolerators was made up of a high percentage of psychoneurotic individuals. Most of them manifested disturbances that are well within the normal range. They differed from the other subjects mainly with respect to the organization of their emotional needs and with respect to the ability to mobilize their resources under conditions of stress. We believe the value of the present work rests largely on the fact that specific discriminating patterns have been set up in the normal range of personality which are positively related to anoxia tolerance.

The Rorschach data were examined in many different ways in order to discover what distinguished subjects with different degrees of anoxia tolerance from each other. Certain clues as to differences in personality organization that were relevant to the problem of tolerance were obtained when the subjects were studied with reference to the ratio between the number of their human movement responses and the sum of their color responses. This ratio is considered an index of the basic pattern of personality structure of the individual (36, 5, 23). The subjects were divided into four groups on the basis of the patterns obtained. In accordance with the nomenclature of Rorschach, (with some slight variation indicated in the Results section), subjects with very little movement and color were classified as coartative, those with responses equivalent in weight in both areas were classified as ambiequal, those

[8] Despite the clarity of the results obtained on this sample of subjects, further work testing the predictive value of the patterns that have been determined should be done and is being planned.

whose human movement responses predominated over the color responses were classified as introversive and those whose color responses were more frequent than their human movement responses were classified as extratensive.

The individuals in the coartative group reacted least adequately to the anoxia situation. These individuals are generally the most poorly adjusted of all the subjects. Their emotional development is the least mature, they tend to be greatly inhibited and cannot meet ordinary situations of stress with facility.

The extratensive group reacted more adequately to the anoxia conditions but not as well as did the ambiequal and introversive group. The extratensive group is the most outgoing of the four groups designated. We do not believe that this characteristic is the relevant factor in placing the members of this group lower on the scale of tolerance than the ambiequal and introversive subjects. The conditions under which their outgoing emotional reactions are expressed are the essential factors. Insofar as their reactions are indices of undifferentiated and uncontrolled emotional responses and to the extent that outgoing behavior is not associated with adequate internal checks, we are dealing with individuals who have some personality disturbances which are likely to be related to anoxia tolerance. But extratensiveness as such is not likely to indicate poor adjustment, while coartativeness as such indicates poor personal adjustment.

Various patterns of adjustment may be associated with the ambiequal and introversive constellations. Both patterns, however, are found in individuals who tend to have effective emotional control though they may not develop the same techniques to maintain such control. Moreover, the level of human movement responses used to place a subject in either group is an index of inner stability. This alone may account for the superiority of the ambiequal and introversive groups as a whole over the extratensive group with respect to anoxia tolerance. The consideration discussed above in relation to the constellations determined from movement and color responses would indicate the factors determining individual exceptions to the general rule. Within the ambiequal and introversive patterns maladjustments could arise, while well adjusted individuals could be found with a basic extratensive organization.

Correct placements which were greater than chance were obtained when individuals were put in either high or low anoxia tolerance groups using only the constellations as a basis of judgment. On this basis individuals with ambiequal or introversive constellations were placed in the high tolerance group and individuals with coartative or extratensive constellations were placed in the low tolerance group. It seemed likely that even more accurate judgments could be made if other relations, which cut across the constellations, were employed in evaluating the personality organization of our subjects.

The inadequate reactions of the coartative group to reduced oxygen tension would indicate the need for looking for disturbances in our subjects which were similar to those exemplified in the coartative group. A number of different Rorschach signs of disturbance were examined with reference to their presence among individuals responding favorably and unfavorably to our anoxia conditions. Six signs were retained as having discriminative value between our groups of good and poor tolerators. Five of these were obtained from the nine signs proposed by Miale and Harrower-Erickson (29) as indicative of psychoneurotic personality structure. A number of signs, which had been accepted from previous work as being indicative of disturbances in the personality, including other psychoneurotic signs, did not discriminate our two groups of subjects. This does not necessarily vitiate the value of non-discriminating signs for assessing the total personality. But it would indicate that not all possible areas of disturbance are relevant to the anoxia adjustment problem. It is for this reason, in all probability, that over-all personality ratings which, in effect, involved taking under consideration signs which did not discriminate individuals with respect to their tolerance of anoxia, did not differentiate our subjects as well as the signs which were specifically tested.

The signs diagnostic of poor anoxia tolerance are listed below. A fuller discussion of their significance is to be found in the section on results. The three signs most characteristic of the poor tolerators as compared to subjects responding adequately are: (1) Shading shock, indicative of deep underlying anxieties, (2) refusals or inability to respond to a slide (card), indicative of emotional blocking, and (3) zero or one human movement response, indicative of low inner resources. No subject responding adequately to anoxia had either of the first two signs, while only one subject in this group had the third sign. The three remaining signs, which were not as discriminating as the first three, are: (4) Color shock, indicative of disorganization in the face of pressing emotional situations, (5) no form color responses, indicative of failure on the part of the individual to integrate his needs with external stimulation, and (6) negative color balance, that is, the subject produces more color form and pure color responses than form color responses. This sign is indicative of a preponderance of immature ways of coping with emotional stimulation. The first three signs listed are more significant indices of disturbance in college students than the last three.

The patterning of signs obtained was extremely consistent. No subject in the high tolerance group had more than one sign. Each person in the low tolerance group who had only one sign had one of the more drastic signs. All but one person in the high tolerance group who had only one sign had one of the less significant signs. Differentiation on the basis of signs was thus very clear cut. Two patterns which enabled us to place our subjects in their proper tolerance groups on the basis of the signs were derived. The first one divided the subjects into those with none or one sign and into those with two or more signs. Individuals in the first class were judged to be good tolerators of anoxia and those in the second class were judged to be poor tolerators. Thirty-six of our subjects had been judged to be either good or poor tolerators of anoxia on the basis of their actual reactions to the anoxia conditions of our experiment. Of these 24 had been placed in the good and 12 in the poor group. By using the criteria just described all 24 good tolerators were correctly placed on the basis of Rorschach signs and 7 of the 12 poor tolerators were correctly placed. Thus a total of 31 out of 36 subjects, or 86%, were correctly placed by this method.

A different break-down yielded better over-all results, predicting the poor tolerators more adequately than the previous break-down does. By this method individuals were judged to be in the good group if they had none or one sign, except if the sign was the human movement or shading shock sign, in which case they were assigned to the poor group. Subjects were judged to be in the poor group if they had two or more signs or the human movement or shading shock sign. Twenty-three out of 24 subjects were properly assigned to the high tolerance group, while 9 out of 12 were properly placed in the low tolerance group. The over-all correct placement was 32 out of 36, or 89%.

It is clear that even the best method of placement is less accurate in predicting poor tolerators than it is in predicting the placement of good tolerators. The possibility arises that despite careful medical examination some of the subjects responding inadequately to reduced oxygen tension do so for purely somatic reasons.

The personality differences between the good and poor tolerators of anoxia can be briefly described.[9] The good tolerators are by no means perfectly adjusted. But they display compensating features in their personality organization which prevent their difficulties from becoming focal points in determining inadequate reactions of stress. Thus those of our good subjects who tend to become disorganized in the face of emotional problems also have the power to recover. Those who lack the ability to accept stimulation from others do not go off in diffusive emotional explosions. Those who tend to be impulsive are able to apply internal checks at appropriate times. They are not motivated by repressed anxieties that express themselves in nameless fears. They are able to make some positive effort in the direction of coping with an unforeseen difficulty as they have developed dependable resources through the course of their lives.

The more adequate subjects thus either have very minor adjustment difficulties, if any, or are able to cope with their more serious problems by various methods of control they have developed. The subjects reacting poorly to anoxia generally have compounded difficulties. This makes the handling of their personal problems more complex for them. There are too many facets to be kept under control. Stress situations bring pressure to bear in an exceedingly uncomfortable fashion. In a sense a stress situation, for them, becomes one in which they are attacked on many more sides than are the subjects who are better adjusted. At the same time they have developed less capable resources to meet this stronger attack. More frequent breakdowns under conditions of more violent attack and less adequate defense must, of necessity, be expected. Different patterns among these subjects have been described in the results section of this paper and may for convenience be repeated here. The bulk of our subjects with poor anoxia tolerance showed one of the following patterns: (a) deep anxiety, (b) difficulty in applying their own resources, (c) anxiety and obvious emotional disturbances in ordinary life situations, (d) inadequate responsiveness to the external world in relation to their inner needs, (e) difficulty in applying their own resources linked with easily observed disturbance in ordinary life situations, (f) the combined extreme pictures of anxiety, lack of rapport with the outside world and inability to assemble their own resources.

2. *Secondary Findings*

a. The experiment demonstrated the practicality of administering the group Rorschach test under anoxia conditions.

b. It indicated the need of obtaining altitude protocols before obtaining sea level data when the Rorschach test is used to study changes due to anoxia.

c. The development of diffusive emotional reactions under reduced oxygen tension was demonstrated through some of the Rorschach test changes. This was consistent with similar demonstrations of this fact by other methods.

[9] The general descriptions which follow are based on the Rorschach protocols.

3. *Area or Applicability of Findings*

The most general finding of this study is that there is a relationship between personality organization and tolerance for the stress produced by reduced oxygen tension. A stress situation may be thought of as making stronger demands on the individuals whose personality organization is in the psychoneurotic direction than on those who are more normal and of being met by them with less adequate defenses. We feel, therefore, that these findings are of relevance to the study of a great many varieties of stress and are not confined only to the problem of anoxia tolerance.

The specific patterns that we found to be of discriminative value must be treated with caution. Ross (37) has shown that similar patterns are related to educational status. Hertzman and Margulies (19) have shown that they are related to age. But given a group of individuals at the college level, who vary in age between 17 and 25, these patterns must be considered as being differentiating, as shown by our data. It is precisely individuals of the above age range educational status in whom we would be most interested at present in connection with military aviation problems.

The specific patterns which would be most discriminating may very well vary with different stress situations. In all probability the patterns discovered in other situations will bear a strong resemblance to the ones presented here. It would be of particular interest to study personality organization in relation to a generalized stress situation, such as the stress interview developed by Freeman *et al.* (13), and then to relate the behavior of subjects in this situation to their behavior under more specific strains. Knowledge about "aptitude" for the tolerance of stress and strain and the most relevant personality factors entering in could thus be obtained.

Our data may also have value in the selection of pilots. McFarland (25) noted that successful civilian pilots were "stable and dependable rather than flighty and excitable. The popular concept of the aviator . . . as a dramatic, audacious, carefree individual seems to be quite false. . . . The pilots in this group appeared to be well poised and emotionally stable with many of the psychological characteristics found in a group of professional men intent upon mastering a chosen field of endeavor" (25, p. 32). Emotional control and inner stability were among the outstanding features of subjects who reacted well to anoxia.

Bigelow (6) emphasizes the need of the development of tests which will identify "psychiatric deviations even within normal limits which may be expected to interfere with flight training or with the subsequent performance of duty and those deviations which may be safely ignored for pilot selection" (6, p. 384). One value of the Rorschach test, as has been shown in this study, is that patterns in the normal range can be discriminated and related to a behavioral situation.

The application of other projective tests, particularly tests of phantasy such as the thematic apperception test developed by Morgan and Murray (30), may be possible here. The practical disadvantages in thematic apperception rest on the fact that the test makes greater demands on the time of both the subject and the experimenter and the protocols it yields cannot be classified as precisely as Rorschach data. Nevertheless, Balken and Masserman (3) report patterns obtained from thematic apperception data which distinguished patients suffering from conversion hysteria, anxiety states, obsessive compulsion neuroses, and paranoia from each other. If equally reliable distinctions can be made within the normal range through the use of this test, it may be of great value in the problem of pilot selection.

One cannot expect perfect selection, however, by any set of personality tests no matter how good. For some individuals actual performance after training can be the only significant test. Bigelow (6) has observed men who have been successful in military flying who have psychiatric deviations. A determining factor of success or failure is the manner in which these deviations are related to aviation. Armstrong (2) has pointed out that men with many years of successful flying experience may develop an aero-neurosis. He doubts whether these men should be weeded out before flight training even if they could be identified. It is extremely unlikely, however, that men who have a long history of successful flying under severe conditions subsequent to their training but who develop an aero-neurosis could be identified with a high degree of certainty before they had received any training.

In those areas however where success or failure depends primarily on the reactions of the individual to predictable stress situations, personality analysis preceding the actual training of the individual is likely to be of the utmost value.

4. *Implications of the Results for Diagnosis of Stress Tolerance without the Use of the Rorschach Test*

In many situations where some estimate of the individual's ability to tolerate stress is desired the only material which can be obtained is interview data. The inadequacy of such data, gathered under conditions in which the subject wishes to make a good impression, has been stressed. Nevertheless, some information about the subject in areas relevant to his emotional adjustment may be obtained indirectly. Discussing the interests of the subject with him may reveal something about his resourcefulness and the patterning of his emotional reactions. Getting his impression of the general nature of situations which are new to him may inadvertently reveal his attitude towards situa-

tions requiring novel adjustments. Asking him to talk about his friends and family and the nature of their mutual activities may yield information about the maturity of his emotional responses.

If valid data concerning the stability of the person, the patterning of his anxieties, his reactions to previous stress situations and the resources he can muster under difficulties can be obtained in this manner, they may have direct bearing on predicting his reactions to new stress situations.

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AMERICAN SOCIETY FOR RESEARCH IN PSYCHOSOMATIC PROBLEMS

Report of Activities, 1943-1944

SOCIETY MEETINGS

The Society held a joint meeting in May with the American Psychiatric Association on the Psychosomatic Implications of Chronic Disease. This meeting was attended by an overcapacity audience.

The Annual Meeting was held in Chicago in June on the weekend preceding the annual convention of the American Medical Association. The first part was devoted to a presentation of new research material. The second section was designed for the general practitioner and was devoted to the role of the autonomic nervous system in various psychosomatic disorders. An analysis of the attendance showed a heavy preponderance of representatives from internal medicine.

As the Society has developed it has become increasingly clear that it has two interrelated fields of activity, one being to initiate and sponsor scientific research, and the other to make the results of this research available not only to the medical profession but also to other allied organizations. To this end, joint meetings are being arranged and consultative service is being given to interested organizations on meetings, publications and seminars.

RESEARCH COMMITTEE REPORTS

There are at present nine active Research Committees, all of which submitted reports of their work at the Annual Meeting of the Society. A brief summary of these reports follows.

Committee on Psychosomatic Research

Chairman: Dr. Edwin G. Zabriskie

The Council of the Society authorized this Committee in May 1943 to act as its representative in appointing Research Committee Chairmen and in correlating the work of these committees in their specific research fields.

The functions of these committees are: (1) to review the literature, (2) to hold conferences and meetings with other organizations, and (3) to initiate research projects. The results of these committee activities will be published in monograph form, in the journal Psychosomatic Medicine, or in some other periodical.

Twenty-seven committee meetings have been held since May 1943; seven committees have specifically outlined projects, and three have asked the Council to approve their solicitation of funds to engage the services of qualified workers. The plans of the other two committees for developing their project are almost completed.

A number of conferences have been held. The pattern of conference developed by the committees has been to invite a specially selected group representing various fields related to the topic under discussion to attend an arranged program, keeping this group sufficiently small so that a comprehensive discussion of the papers is possible. The fact that the representatives of various medical disciplines meet to focus on some specific problem, is doing much to break down existing barriers, in terms of research techniques and of helping men from different specialties to speak the same language.

Committee on Cardiovascular Disease

Chairman: Dr. Edward Weiss

Two meetings have been held, and plans are now under way for a conference in New York on November 16th for a small number of invited guests, at which papers will be given on Cardiac Decompensation.

Committee on Cutaneous and Allied Diseases

Chairman: Dr. John A. P. Millet

The committee has held three meetings, and has made plans to review the literature written from the physiological, pharmacological, experimental and clinical points of view, on the complex problems of skin physiology and pathology. It is hoped such a review will clarify the present state of knowledge in this field, define standards, and indicate the problems still in need of further elaboration. The Council has approved the committee's plan to secure a grant for a paid worker on the project.

It is planned to hold a conference on allergy in New York in the Fall.

Committee on Infancy and Early Childhood

Chairman: Dr. Milton J. E. Senn

The committee has held three meetings and conducted a two-day conference in December, 1943, on the psychosomatic problems of the newborn. This conference was attended by forty invited pediatricians, psychiatrists, and child analysts from several cities. A second conference will be held on October 25th and 26th in Detroit.

The project outlined is to collect a bibliography on the physiological and psychological factors connected with eating. The aim will be to permit re-examination of all scientific data on which present-day practices of infant feeding are based. The Council has approved the solicitation of funds by the committee for a worker on this project.

Committee on Medical Education

Chairman: Dr. John Romano

An analysis has been made of the replies to a questionnaire which had been sent by this committee to each

Professor of Medicine and each Professor of Psychiatry in sixty-five Class A four-year medical schools in the United States. The questionnaire concerned the present status of medical education on the relationship of modern psychiatry to the theory and practice of medicine. The data revealed considerable confusion in the minds of educators (internists and psychiatrists) as to methods, scope and goals of modern teaching in psychiatry. The term "psychosomatic medicine" appears in some cases to be accepted as a new technical skill rather than as a point of view, and a method utilizing the skills of many medical disciplines.

Several problems are apparent. One is the problem of personnel, i.e., how sufficient men with adequate training in psychiatry and in medicine can be secured for teaching. The second problem is the curriculum. Will it be possible to add to, or subtract from, the four-year curriculum in order to obtain the awareness and the skills necessary to the good doctor of tomorrow.

It was decided that there were two fundamental points to be presented to those in charge of medical education: (1) the need for more adequate training in modern psychiatry for the student who will soon be a military physician, and (2) the need to appraise realistically methods, scope and goals of teaching in psychiatry and in medicine in all areas in which they complement each other.

Committee on Obstetrics and Gynecology

Chairman: Dr. Raymond Squier

Substantial progress has been made in reviewing medical literature of the past twelve years. Plans are now under way for setting up a project in the Pre-Natal Clinic of a hospital. The area of investigation will be mapped out by the committee.

For more than a year certain members of the committee have been actively engaged in correlating personalities with the progress of pregnancy, the behavior in labor, and the adjustments in the puerperium. Enough material will be accumulated within the coming year to furnish the basis for a conference.

Committee on Physiological Mechanisms and Animal Experimentation

Co-Chairmen: Dr. Ralph Gerard, Dr. Jules Masserman

The two committees of Physiological Mechanisms and Animal Experimentation have been recently combined. Three committee meetings have been held. A conference of this committee was held in Chicago in June. Dr. Frank Beach presented a review of the literature on "Effects of Hormones on Animal Behavior". Another conference is being planned for December.

Committee on Psychological Methods and Concepts

Chairman: Dr. Bela Mittelmann

Two committee meetings and two conferences have been held. The conferences have been devoted to projective techniques. An attempt is being made to correlate data obtained by four methods of investigation in psychosomatic medicine: (a) Clinical history (b) Rorschach analysis (c) Handwriting analysis (d) Figure drawing analysis. A number of other projects are being mapped out, for which various members of the committee will be responsible, in such fields as history-taking and interview, hypnosis, chemical methods combined with psychotherapy, statistical and non-projective methods.

Committee on Social and Cultural Problems

Chairman: Mr. Lawrence Frank

Subcommittee on Cultural Factors in Childrens' Illnesses

Chairman: Dr. Hilde Bruch

Two clinical entities that can be diagnosed by objective means, diabetes mellitus and obesity, are being studied in hospital settings. By observing the various racial backgrounds of the patients, it is hoped to obtain leads as to how these entities can be studied in wider settings and thus gradually enlarge the scope of the investigation so that social and cultural factors become increasingly correlated with medical findings.

Subcommittee on Psychosomatic Factors in Health Insurance

Chairman: Mr. George Soule

A report is being drafted to develop the following theme:

(1) Relation of psychosomatic medicine to the problem of cost and economy in any health insurance plan;

(2) Therapeutic dangers of crystallizing unsatisfactory types of medical practice.

The report will examine a few of the more prominent plans for health insurance, and point out flaws they may contain from the above points of view. One problem to be considered is the distinction made in current legislation between the classification of organic and that of nervous and mental diseases. Positive recommendations affecting the type of medical service which should be offered under these plans would be made. These recommendations would be tentative and put forward as a basis for discussion.

Committee on War Medicine

Chairman: Dr. Harry C. Solomon

A project has been proposed to study aviators, who, following the completion of their tour of operational combat develop symptoms apparently due to emotional distress and are discharged from the service for this reason. The National Research Council, looking favorably upon the consideration of this problem, allotted $500 to the committee for expenses in investigating and setting up this work. The project has now been outlined in some detail and approved by the Council. Lt. Col. Murray has given assurance that the Air Force will look favorably upon this study, and will do everything to facilitate it.

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Plans are under way for the next year. In addition to committee conferences, the Society will cooperate with the American Public Health Association meeting to be held at the Pennsylvania Hotel, New York, from October 2nd to 5th, presenting papers at several section meetings.

Plans are under consideration for the development of projects in relation to demobilization and postwar reconstruction, which are at present handicapped by the lack of trained personnel.

BRUCELLOSIS

A Case Report Illustrating a Psychosomatic Problem

HAROLD J. HARRIS

Lt. Comdr. (M.C.) U.S.N.R.

E. A. M., a 47-year-old Jewish Naval Reserve Officer of the line, on active duty, had been a frequent visitor to the dispensary at the station to which he was attached. After trying various types of medication which had been given him, he himself requested psychiatric consultation.

Chief Complaints were headache, diarrhea, abdominal distension, "nervousness," fatigue and loss of weight.

Present Illness had begun about a year previously. Headache was temporal, beginning over the right side and spreading over toward the left, usually lasting about seven hours. The diarrhea and distension occurred only in the morning and subsided after three or four loose movements. Marked fatigue had existed throughout and he had lost about eight pounds in weight.

Past History was irrelevant except for complaints of recurrent nervousness over a period of fifteen years, manifested by tension, occasional jitters, always accompanied by abdominal "gas pressure" and occasionally by palpitation. He had been mildly depressed at times, especially in relation to the long illness and ultimate death of his mother. He also had been worried over the illness of his wife, to whom he had been married for two years, during which illness she had aborted. An adopted child had been seriously ill with mastoiditis. He had noted a definite but selective diminution in libido. He had been told that he had a moderate hypertension, at various times, ranging as high as 180/95.

Family History was non-contributory except for the racially characteristic emotional bond with the parent.

Physical Examination was essentially negative except for moderate distension of the abdomen. Blood pressure was 132/74, pulse 74. Complete blood count was negative except for slight leukopenia. Blood Wassermann was negative. Gastro-intestinal x-ray, gallbladder x-ray, x-rays of sinuses all were negative. Eye examination showed insufficient refractive error to account for headaches. Temperature range was within normal limits. Stool was negative for ova, parasites or pathogenic organisms.

Impression. Psychoneurosis, with evidences of neurasthenia and anxiety neurosis, seemed to be well established. The patient had excellent insight. It was felt that perhaps prolonged psychotherapy would furnish the only effective approach but the difficulty of making it available without hospitalization was apparent. His official duties were of a nature that made him quite essential to the Navy. The officer was loathe to risk discharge from the service. He had accepted appointment for purely patriotic reasons and keenly desired to continue on duty.

Subsequent Course. While trying to decide how to dispose of this problem, it occurred to me that I had failed to do the routine tests for brucellosis, in spite of long-established custom to do them in all obscure illnesses, and of my often-repeated contention that brucellosis may masquerade under many guises, including the psychoneuroses. Also overlooked was the known tendency for brucellosis to intensify and obscure a psychoneurotic tendency. The routine tests were done on December 11th, 1943. Blood agglutination test was negative. Skin test was positive. Opsonocytophagic test showed virtual absence of resistance to Brucella infection (marked phagocytosis in 0 cells, moderate in 0 cells, slight in 7 cells, and none in 18 cells). Culture was not attempted, because of technical difficulties in isolating this elusive organism.

The patient was told only that these were additional routine tests, done for the same reason that his previous laboratory study and physical examination had been made. On the sixth day following, he reported that to his surprise he had had no diarrhea and less distension since the day following the tests, that his headache had become moderate and that his energy had greatly increased. Because of this definite improvement, which might have been psychogenic or might have been in response to the intradermal Brucella abortus vaccine used for the skin test, such as had been noted in other patients, his phagocytic index was redetermined on December 18th, 1943, one week following the intradermal test dose of vaccine. The index had risen to a high level, fourteen cells showing marked phagocytosis, five moderate, three slight, and three none, indicating a sharp rise in resistance to Brucella infection.

No treatment was prescribed in view of his clinical improvement and the satisfactory degree of resistance attained. On January 5th, 1944, the phagocytic index was redetermined and was found still to be sufficiently high (13-8-3-0) to indicate no need for vaccine or other therapy. He had felt entirely well, with no symptoms referable to his long-standing illness, with the exception of one day (December 23rd) when he had had moderate distension, diarrhea and flatulence.

On February 10th, 1944, his index had shown a moderate drop in resistance (7-10-8-0), suggesting the possibility of relapse. He reported that he had had a few days of recurrence of symptoms beginning about February 1st, 1944, which had been again followed by complete freedom from symptoms.

On March 18th, 1944, the phagocytic power of his white cells was again determined and found to be at a very high level (21-4-0-0). He was still free of symptoms.

There is little doubt that this patient, whose neurotic manifestations overshadowed all else, suffered from brucellosis. It seems equally apparent that the temporary (or perhaps permanent) recovery was induced by the skin testing dose of vaccine, fortuitously. Redetermination of the phagocytic index at longer and longer intervals, over a period of years was advised, as a criterion of his status and to anticipate possible relapse.

By way of explanation the following proved points should be restated:

1. The agglutination test is negative in a large proportion of chronic Brucella infections, even in the presence of positive culture.

2. The combination of a positive skin test and a low phagocytic index in a patient whose clinical symptoms suggest brucellosis is presumptive evidence of brucellosis.

3. Rise in the phagocytic index will almost invariably presage or parallel clinical improvement or recovery.

4. Abdominal distension of otherwise obscure origin is often an accompaniment of brucellosis.

5. The phagocytic response of the patient's white cells to a single intradermal dose of Brucella vaccine may be marked and sustained. It has been noted in at least three cases previously reported.

Comment. This case history illustrates one of the difficulties frequently encountered in the differential diagnosis of brucellosis. Chronic brucellosis often will give a textbook picture of neurasthenia, as pointed out by Alice Evans and others. When Brucella infection co-exists with a psychoneurosis or occurs in an emotionally labile person, all manifestations are likely to be attributed to the neurosis. The frustration felt by these patients in their prolonged search for diagnosis and cure serves to produce psychoneurotic response, or to intensify those already co-existent. This unfortunate state too frequently leads to the compounding of the original error and the decision that "there is nothing really wrong," or it is "just a neurosis—no treatment is necessary."

It must be equally well borne in mind that the converse of this situation may occur. The patient, completely recovered from an old Brucella infection, with a definite and clear-cut psychoneurosis, may be diagnosed as having active chronic brucellosis by the unwary clinician who fails to use the multiple tests, and to interpret them accurately. The neurotic patient who has little insight will often seize on such a diagnosis rather than to admit the stigma so often attached to the diagnosis of a neurosis or to submit to psychotherapy.

That psychoneuroses develop in a vast majority of patients suffering from any chronic illness of long standing will not be disputed by any clinician. That it be properly evaluated as a concomitant of the illness, as a contributing factor, or as a sequela, is of vital importance to the successful management of the illness as a whole. When psychoneurosis and an infectious disease co-exist, each must be considered in relation to each other—and above all, in relation to the patient.

It matters little whether the neurosis existed and was aggravated by the frustrating and depleting chronic illness or whether the neurosis arose out of the somatic illness, or was coincident with it. Severing either link is insufficient, if indeed possible at all. Even following recovery from the infectious process the patient is likely to attribute all symptoms that remain or subsequently arise to the illness and to demand further treatment. When psychotherapy as an adjunct is suggested, they are often argumentative and prone to look upon the clinician as inconsistent since he originally diagnosed the condition as brucellosis. If an attempt is made to treat the neurosis first, it is thought to be inconsistent but proves to be futile, for the infectious disease itself is manifestly important.

The case history presented perhaps is not very illustrative of the need to evaluate and treat the physical and psychogenic component of the total illness. There was but a small problem left when recovery from the infectious disease was brought about. However, had the patient not possessed good insight, a problem would have remained. His feeling was: "I've always known that I had various evidences of neurosis but I knew that it wasn't *all* neurosis. I can live comfortably with my neurotic manifestations now that I feel so much better physically." He was quite aware that there was some concomitant psychotherapeutic effect in the treatment of his infectious disease.

The opinions expressed are those of the author and do not reflect those of the Medical Department of the Navy or the naval service at large.

FUNGUS INFECTION OF FEET

A Case Report Illustrating a Psychosomatic Problem

HAROLD J. HARRIS

Lt. Comdr. (M.C.) U.S.N.R.

J. W. H., a handsome, well-built, virile-looking Marine Private, First Class, reported at sick call at a naval station, complaining of "nervousness." He was referred for a psychiatric opinion with the observation that he was probably a malingerer.

Chief Complaint was: "I'm disgusted with the Marine Corps—I don't eat or sleep, there is trouble at home, my mother has arthritis; I want a discharge." *Present Illness* had begun soon after enlistment on March 2nd, 1942. Between that time and February 29th, 1944, he had spent 210 days in various naval hospitals, 150 days of which was for recurrent fungus infection of the feet, 45 days for lobar pneumonia, 11 days for bronchitis, and 4 days for catarrhal fever. He stated that the fungus infection, plus his worry over the illness of his mother, had combined to make him useless to the service. *Past History* was irrelevant except for a "nervous breakdown" in civilian life, at the age of 18, at which time he did not work for about one month. *Family History* was, on the surface, non-contributory except for the death of his father when he was six years old.

Physical Examination was essentially negative except for scattered areas of semi-active fungus infection of feet and ankles and a moderate degree of pronation of the feet.

Neuropsychiatric Examination revealed an inordinate number of significant answers to routine questions such as those listed on the Cornell Selectee Index. He had used alcohol excessively for the past two or three years; he frequently felt faint and had fainted several times; he suffered from frequent headaches and vertigo; he often had difficulty in breathing; he was subject to attacks of shaking and trembling and of palpitation and periods of exhaustion; he was frequently troubled by nightmares, by severe itching, nausea, hot and cold spells, frequency of urination, and indigestion; he felt that he was misunderstood, that he had been treated unfairly, that he was being observed and talked about in the street; he had difficulty in forgetting an unpleasant experience; was shy, touchy and sensitive, and could not do good work while people were looking on; he was easily upset and irritated; he was upset by the sight of blood, and felt uneasy urinating in a public toilet; he did not make friends easily; he had had asthma in early life and a nervous breakdown at the age of 18; he sweat a great deal without exercise. His self-esteem was at a low ebb.

Preference for the following jobs was indicated. Actor, artist, dancer, music teacher, and singer. For 39 other jobs he indicated dislike.

His frequent recurrences of fungus infection, which had never been completely cured, plus his nervousness and worry about his mother's arthritis, were stressed in the course of the interview. He showed a typical letter from his mother in which she had again set forth all her problems, physical, emotional, and financial. These letters, he stated, were very frequent. He considered them pathetic and adequate evidence of his need for discharge from the service so that he could be with her. He felt that he owed everything to her. She had brought him up following the death of his father. He seemed unduly grateful to her for that. She had opposed his going to work as a page boy for a radio broadcasting company, but he had taken the job and had suffered a nervous breakdown, which he attributed to disobedience of his mother's wishes and the social life he led while there. However, after a month's rest, he had returned to work for the same company in various capacities—as press relations officer, announcer, and the like.

The likelihood of cowardice or malingering was further dispelled by questioning. He had enlisted in the Merchant Marine prior to our entrance into the war and prior to his enlistment in the Marine Corps. He had served for a year on a freighter, returning to work on another ship when the first one was torpedoed and sunk.

Because of his apparent ability to develop insight, and because confirmation of the suspicion of the cause of his anxiety was important for the proper disposition of the problem, he was told that the greatest part, if not all, of his difficulty was on the basis of anxiety engendered by his homosexual trend. At first he vigorously denied such knowledge or experience, but finally admitted that he had had various sexual experiences, with males and females, beginning when he had first gone to work for the radio broadcasting company, and preceding his nervous breakdown. He maintained that he preferred females to males but admitted that it had been extremely difficult for him at times since enlistment in the Marine Corps, especially when taking showers along with other naked Marines.

It was pointed out that realization of the cause of his anxiety was essential to his cure, regardless of whether discharge from the Marine Corps was recommended. He showed excellent insight and accepted the causal relationship between the anxiety state and his intractable infection. It was apparent to him that the profuse sweating of his feet (and hands) made cure of the fungus infection impossible. He was unwilling or unable to accept the still deeper relationship between the domination by his mother and his psychological arrest at an early and homosexual developmental level.

He was transferred to a U. S. Naval Hospital for disposition, with the recommendation that he be discharged from the service.

Summary. A virile-appearing, handsome, twenty-four-year-old Marine had spent 210 days in naval hospitals during a two-year period of service. Of this time 150 days had been because of recurrent fungus infection. Execution of the Cornell Selectee Index (Form C) revealed a severe anxiety neurosis manifested by 47 psychosomatic complaints, very low self-esteem, and an unmistakable feminine trend in job

preference. When the data were discussed with him he admitted bisexuality. He was given sufficient insight to understand the mechanism: Homosexuality → anxiety state → excessive sweating of hands and feet → inability to cure fungus infection in the presence of constant moisture.

Conclusions. 1. Had the Cornell Selectee Index, or other rapid screening method, been used at the time of enlistment, this young man would not have been accepted for the service. His anxiety would not have been increased by separation from his mother and by close contact with men. Naval hospitals would not have had the burden of his 210 days of hospitalization. The various departments of the Marine Corps and Navy would have been spared innumerable hours of useless clerical work. There would have been no need for the lengthy procedure incident to further hospitalization prior to ultimate separation from the service.

2. A written form for preliminary psychiatric examination is desirable. The patient usually will be absolutely honest in executing a well-prepared list of questions, perhaps because of fear of perjury if truth is concealed, or perhaps because of naiveté if the questions are propounded with sufficient cleverness.

The opinions expressed are those of the author and do not reflect those of the Medical Department of the Navy or the naval service at large.

1945 ANNUAL MEETING

The annual meeting of the American Society for Research in Psychosomatic Problems will be held in New York on June 8 and 9, 1945, prior to the annual meeting of the American Medical Association. One day will be devoted to the presentation of original research material, the second day to the general topic of brief psychotherapy in psychosomatic disorders. Persons who wish to present papers on the first day should submit full abstracts of their material before April 1, 1945. Papers will be limited to fifteen minutes. The abstracts should be sent to Dr. Edwin G. Zabriskie, Chairman of the Program Committee, American Society for Research in Psychosomatic Problems, 714 Madison Avenue, New York 21, New York.

REVIEWS OF PERIODICAL LITERATURE

JACOBS, BETTY: *Puerperal psychosis.* J. Ment. Sci., **375**: 242, 1943.

Twenty-one cases of psychotic reactions following childbirth were studied and case material of an additional 131 cases surveyed. It was concluded that "puerperal insanity" as a clinical entity does not exist, and that every reaction type defined in clinical psychiatry may occur in the puerperium. Various factors contributing to the origin of psychotic reactions following childbirth were isolated: hereditary loading, predisposing personality trends, environmental and sociological conditions, psychological experiences arising from childbirth, and physical complications of the puerperium. It could be demonstrated that the latter factor, which in the past had been regarded as the most important, plays only a minor role, and operates as a precipitating agent only in cooperation with other intrinsic and extrinsic factors. In more than half of the case material the reaction type was typical of one of the affective psychoses, and in this group the constitutional make-up, as illustrated by heredity and pre-psychotic personality features, was found to be particularly important though even here it did not operate without additional precipitating conditions. In a proportion of the affective psychotic reactions the clinical picture was colored by features of the organic reaction type. In a considerable proportion of the melancholic reactions paranoid features were prominent, the delusional ideas being of the katathymic type, connected with psychological implications of childbirth. Such paranoid features were found not before the fourth decade, and in some cases the melancholic reaction merged into a chronic paranoid condition. The comparatively small number of typically schizophrenic reactions could be partly attributed to the low marriage and parity of schizophrenics and schizoid personalities. The wide variety of psychogenic factors based on environmental and sociological conditions was demonstrated and analyzed. Preventive measures, including psychotherapy in the prenatal period were emphasized.

F. V. L.

BEAR, J.: *Psychological study of sterility in women.* Sch. Med. Surg., **105**:525, 1944.

The orientation of this paper is psychosomatic. Hormonal cycles and psychosexual development are interrelated, therefore irregularities in gonadal cycles may result from psychosexual fixations. Discharge of ova not prepared for fertilization and premature maturation of follicles may result from the desire for a child. Changes in metabolism result from the psychasthenic effects of involuntary sterility in women and may be of serious proportions. In sum, the generative function is likewise subject to psychosomatic dysfunction and psychotherapy often brings improvement.

F. V. L.

SONTAG, LESTER W.: *War and the fetal-maternal relationship.* Fam. Liv., **6**: 1944.

A study of 200 children born of mothers whose diet was deficient in Vitamin D showed two thirds to have developed active rickets when they were a month old although rickets had not been present at birth. Children of Vitamin D deficient mothers had soft baby teeth and showed a higher incidence of decay at 5 or 7 years. Not only were the children of a group of mothers whose diets were supplemented with vitamins healthier, but labor was shorter.

Chemicals such as acetylcholine and epinephrine, liberated into the bloodstream by rage, fear, anxiety and so forth pass through the placental filter into the fetus' bloodstream and some of them act as stimulants to the nervous system of the fetus. Maternal emotional stresses of various sorts may indirectly affect the fetal nervous system. Some of these effects are manifested by a marked increase in body activity and heart rate of the fetus. An increase of several hundred per cent was noted in the body movements of fetuses whose mothers were undergoing emotional stress. Such fetal responses usually lasted several hours, even when the maternal emotional stress was of short duration.

The immediate effect of prolonged emotional maternal stress evident at birth is a reduced birth weight although birth length is maintained. Another change apparent at birth in infants of mothers undergoing severe emotional distress is in total activity level. From the beginning such an infant is hyperactive, irritable, squirming, crying. He empties his bowels at unusually frequent intervals, spits up half his feedings. He is a neurotic infant when born. Severe maternal fatigue, unusual abdominal pressure, violent and repeated sounds are capable also of producing immediate fetal movements.

During World War I the average birth weight of war babies dropped significantly. The mechanism of this may very well have been in part the emotional factor discussed. The alterations in fetal environment most important in war are perhaps in nutrition and in the chemical-physiological changes in the mother's body brought about by maternal emotion and possibly fatigue. Alterations in these factors may produce infants more susceptible to disease. There may be gross alterations in skeletal structure. Unfavorable fetal environment, therefore, is an important factor in the creation of "constitutionally inadequate" infants.

F. V. L.

COBB, STANLEY: *Review of 1943 neuropsychiatry.* Arch. Int. Med., **72**:795, 1943.

A summary of shock therapy is included. Less enthusiasm for any type of shock therapy is manifested by sound psychiatrists today, the author points out. The hopes of 1938 when insulin shock therapy was at its height have vanished, except for the use of insulin in relieving certain symptomatic manifestations of schizophrenia. Metrazol has been largely given up because of the resulting brutal convulsions and attendant injuries to the patient, such as fractures and the like. Despite the current vogue for electric shock therapy and its apparently good results in selected instances as in involutional melancholia, a word of caution is in order. The anatomic and physiologic effects on the brain of electric shock therapy are not known. In hospitals it has been

found that many disturbed and active patients can be made quieter by shock treatment. Their behaviour is so much improved that nursing is simplified. The appearance of some of them, however, is as if they had been partially decorticated. "One feels doubtful of the ethical standards that allow shock treatment to be given for the purpose of making nursing easier for the hospital administration. It comes dangerously close to punishment, and logically one might ask 'Why not euthanasia?' "

A summary of investigations of psychoanalytic concepts by non-Freudian workers is included. These studies have resulted in some confirmation for the libido theory, infantile sexuality, the castration complex, the polymorphism of perversion; repression and regression.

F. V. L.

HOCH, PAUL H.: *Psychopathology of the traumatic war neuroses.* Am. J. Psych., **100**:124, 1943.

This paper lists three typical manifestations of traumatic war neurosis: 1. Vegetative storm, characterized by disturbances affecting all parts of the body, more especially in the digestive, circulatory and respiratory systems, with alteration in the sleep-function, disturbances in the function of the heart, diarrhea, vomiting, anorexia and other vegetative symptoms; 2. Motility storm, characterized by trembling, shaking or when inhibiting mechanisms have the upper hand, to immobility and cataleptic states; 3. Emotional storm, characterized by terror, leading to narrowing of consciousness, amnesia, confusion or in some to stupor or excitement.

The author emphasizes that the first anxiety phase of the traumatic neurosis is a psychosomatic entity and has to be attacked in addition to psychotherapy, with new methods of sedation or even anesthesia. The practice of delaying or postponing the treatment of the emotional shock is largely responsible for the development of many of the chronic neurotic states.

In the acute stage of the war neurosis a dissociation probably occurs between cortical activity and the subcortical emotional and vegetative or regulatory function. This would explain many symptoms of the acute war neurosis; such as the hyper- or hypo-excitability, the lack of emotional control, the inability to select stimuli, but to respond "totally" to every little stimulus which is in no relationship to the total response directed toward it. It would also explain the dissociation of vegetative control, and the heightened tendency to convert emotional manifestations into a vegetative function. The insulation of the emotional life of the individual is removed by the acute terrifying experience, and has to be reestablished.

F. V. L.

GERSTMANN, JOSEF: *Imperception of disease.* Arch. Neur. & Psych., **48**:890, 1942.

A section of this paper deals with the dramatic phenomenon of "fantom limb" after amputation, the substitute constructed by the patient to replace the lost limb or other amputated body part, such as those of breast or penis which have been reported. Sudden loss of the part seems essential for this phenomenon. The fantom is most vivid immediately after operation and at that time corresponds to the lost part in shape and size. Generally the fantom part grows shorter as time passes, sometimes becoming smaller like that of a child, sometimes merely telescoping so that the hand for instance will approach the stump of the arm. Sometimes the fantom apes the position in which the part was before loss, as if its last posture were recorded on the body scheme. In cases of congenital absence of a part or loss thereof in early childhood, fantom does not appear.

Cases of imperception proper of disease are reviewed in detail. They have been recorded in: 1. cerebral hemiplegia of the left side; 2. cortical blindness from biliteral lesion of the occipital lobe; 3. visual field defects from tumors in the sella region; 4. left-sided cerebral hemianopia; 5. peripheral blindness after primary optic nerve atrophy; 6. cortical deafness resulting from bilateral lesion of the temporal lobe; 7. aphasic disorder.

Particularly interesting in the non-realization of paralysis cases was a hemiplegia case with paralysis of the left side. When the patient saw other persons in front of her raise their left arms, for example, she experienced a strong obsessive feeling that the limb was her own. This experience only occurred when the other person was at considerable distance from the patient.

F. V. L.

RUESCH, JURGEN AND FINESINGER, JACOB E.: *Muscular tension.* Arch. Neur. & Psych., **50**:439, 1943.

Forty patients with various neurological and psychiatric diagnoses and 12 normal control subjects were studied by a method of measuring the grip pressure and the point pressure during the continuous movement of handwriting. On writing the same standard sentence the patients showed higher values for grip pressure, a greater number of phases and a longer writing time than did the control subjects. The patients gave a greater number of positive answers to questions concerned with feelings of excitement, nervousness, tiredness, trembling inside, shaking and tension in the arms and fingers. A significant correlation was found in the psychoneurotic and the psychotic patients between feelings of neuromuscular tension and high values for point pressure. No correlation was found between feelings of general tension and any of the pressure readings.

F. V. L.

PARFITT, D. N.: *Psychogenic amnesia.* J. Ment. Sci., **379**: 511, 1943.

Thirty cases of hysterical amnesia in male R.A.F. personnel were studied. Organic amnesia was rigidly excluded. Distinguishing marks of organic and psychogenic amnesia are that the former is concerned generally with failure of retention and registration in contradistinction to failure of recall in the latter. Further, the patient with organic amnesia very often attempts to proceed with his work as opposed to the psychogenic type.

Of the 30 studied, 20 had fugues. Their personality-type was egocentric, over-dependent and immature to a degree.

Prolonged emotional dissatisfaction with frustration and self-pity arising from service routine discipline and monotony and associated with a craving for home, sympathy and security was a factor in the majority. Significant conclusions: the hysteric amnesia patient does not forget, he refuses to remember, the "process is active, as pointed out by Freud long ago"; the difference between hysterical amnesia and malingering is only one of degree.

F. V. L.

VONDERAHE, A. R.: *The anatomic substratum of emotion.* New Scholast., **18**:76, 1944.

Bard's experiments on decorticated cats as well as 8 clinical cases from the literature are surveyed. It is concluded that somatic changes resulting from emotion are closely related to the hypothalamus and the preoptic region with some dorsal thalamic nuclei. "The relationship of comprehension to emotion appears . . . to be dependent on the frontal lobe association areas and especially on the connections of these areas with the medial nucleus of the thalamus."

F. V. L.

THOMAS, J. C. SAWLE: *Suicide-attempt brain injury.* J. Ment. Sci., **379**:588, 1943.

A 31-year old laborer lost his job in a foreign country where he was without friends. He thereupon drove a large nail into his right temple to the bone by banging his head against the wall and pushed it into the brain with his hand. Perhaps the most striking feature of the case was the absence of any severe, real depression during the period following the injury, and it is noted that this is in accord with the findings of others in suicide head injury cases. The author notes: "The head injury provided him with the protection which he lacked and the realization that he would eventually be returned to his family without any major effort on his part."

F. V. L.

BOOK REVIEWS

Psychoanalysis Today; The Modern Approach to Human Problems. Edited by Sandor Lorand. New York, International University Press, 1944, 404 pp. $6.00.

In bringing together these 32 essays of 29 authors, Sandor Lorand's aim has been to depict the progress in psychoanalytic research and to give to psychiatrists, medical men, social workers, educators and others to whom the problems of contemporary life are important, a comprehensive survey of the contributions of psychoanalysis to the healing sciences and general culture. For psychoanalysis has given a new perspective to the psychiatrist and student of psychology. The scope of psychoanalysis has broadened with each new discovery. It has outgrown the domain of medicine and has gradually become a part of general human knowledge, producing a revolutionary effect upon the approach to pedagogy, criminology, anthropology, art and all human relationships.

The book is divided into six parts: Part I deals with "Medicine and Psychosomatics," with contributions by S. Ferenczi, S. E. Jelliffe, F. Dunbar, and O. S. English.

Part II, "Education and Social Work," contains excellent brief summaries of the field of Marianne Kris, N. Klein, C. P. Oberndorf, T. H. Ames, and others.

The third part, "Neuroses," starts with a paper by F. Alexander on ego development and is followed by original contributions from M. A. Meyer, A. A. Brill, A. Kardiner, B. D. Lewin, E. Glover, and S. Lorand (character formation). The paper on "War Neuroses" by Ernst Simmel deserves special attention, not only because it deals with one of the most acute psychiatric topics of today, but because it is written with outstanding clarity. It presents the known facts, using stimulating new formulations which lead to new insight.

Part IV deals with "Psychoanalysis of Psychoses" and is written by P. Schilder, G. Zilboorg (manic-depressive psychoses), L. E. Hinsie, and J. H. W. Van Ophuijen.

Part V, a relatively short chapter by Lorand and Bunker, describes psychoanalytic technique and therapy and leads to Part VI, "Applications of Psychoanalysis." Here E. Jones reports on psychoanalysis and religion, H. Hartmann on sociology, Schilder on crime, Ernst Kris on art, F. Wittels on literature, and Geza Roheim on anthropology.

With publication of this extremely useful and valuable book, Sandor Lorand fulfills two important functions. He gives a comprehensive and unbiased survey of psychoanalytic research as it stands today; and he shows that psychoanalysis is a scientific and progressive specialty, in spite of the variance of opinion and interpretation which is found among individual psychoanalysts.

MARTIN GROTJAHN

Recent Progress in Psychiatry, edited by G. W. T. H. Fleming. London, J. & A. Churchill, 1944, 509 pp.

This is an encyclopedic résumé of the neuropsychiatric literature for the five years 1938-1942. The compilation, by more than 30 writers, covers numerous fields of special interest such as psychopathic personality, anatomy of the nervous system, schizophrenia, delinquency, head injury, endocrinology in clinical psychiatry, child psychiatry, and convulsion therapy. The value of the several chapters varies greatly. This is only partly due to the high degree of specialization in the topics covered, the more important obstacle to general interest being the style of writing which all too often is cumbersome, technical to a fault, and at times almost unintelligible. Thus, the chapter on "Genetics in Psychiatry" may well be readable for some non-geneticists, but so far as this reviewer is concerned it has no place in a volume intended for the average trained psychiatrist or neurologist. This contains lingo rather than language, and a curious assumption that the reader is familiar with the technical terminology.

By contrast, the chapter on "Psychopathology" (S. M. Coleman) is excellent. It includes, among many other important topics, a review of recent psychoanalytic developments, presenting the points of view of some dissidents.

Psychosomatic medicine is rather briefly summarized.

J. LANDER

One Hundred Years of American Psychiatry. Published for the American Psychiatric Association by Columbia University Press. New York, 1944, 617 pp. $6.50.

Gregory Zilboorg states in the foreword to this monumental work: "This volume is not a symposium on what American psychiatry is doing or trying to do . . . . The volume is, or it is intended to be, an historical synthesis of a century of American psychiatric evolution, of the birth and development of a medical specialty which but a short one hundred years ago was non-existent, either in fact or in name, and which now not only has a definite, unmistakable name but endless dynamic ramifications. . . . This volume is therefore intended to represent a survey of psychiatry as a growing cultural force."

Thirteen authors, with different points of view but unified in their perspective, join forces to accomplish this task: to write the history of American psychiatry as reflected in the history of the American Psychiatric Association.

MARTIN GROTJAHN

MORGAN, CLIFFORD T.: *Physiological Psychology.* New York, McGraw-Hill Book Co., Inc., 1943, 623 pp. $4.00.

This book offers excellent evidence that physiology and psychology have progressed during the last decade. The text distinguishes itself from earlier works on physiological psychology by its attempts to explain larger aspects of behavior rather than an over-concern with the physiology of the special senses.

The author's scholarship is noteworthy and is apparent from the mass of recent experimental literature he has integrated. His intent was to write a "textbook for undergraduates who are preparing for psychology or medicine and a reference book for graduate students and workers in psychology, physiology, and medicine." The early chapters are rather hurried reviews of the basic facts of cellular physiology and neurology, while the later chapters are taken up with such topics as emotion, sleep and activity, instinctive behavior, and learning.

Since the author's purpose was to establish the physiological mechanisms of normal behavior from a review of pertinent experimental studies, it can not help but interest the clinician who treats problems of psychosomatic nature.

JAMES E. BIRREN

MACKINTOSH, JAMES M.: *The War and Mental Health in England.* New York, The Commonwealth Fund, 1944, 91 pp. $.85.

These essays afford a bird's eye view of the recent past, the present and the future of the mental hygiene movement in England, by the Professor of Preventive Medicine at the University of Glasgow. There are brief descriptions of the voluntary and professional services for mental health, the problems of special groups (soldiers, housewives, industrial workers, children), the modes of reaction to the several stresses and strains of war, and the author's hopes for the future. Of considerable interest is the passing reference to the alarming rise in the number of cases of peptic ulcer, rheumatism, dyspepsia and "many other types of psychosomatic upset" in new soldiers. This parallels the American experience.

The style is simple and readable, pervaded by the author's quiet confidence that the post-war world will take on a rosier hue when proper education is made available to all. Unfortunately, he does not answer nor even raise the question as to how this happy result may be achieved.

One can only agree with the many pious and virtuous sentiments expressed by the author, but one must at the same time deplore the absence of constructive dynamic suggestion as to how to achieve the desired results in the future of mental hygiene. This sterility partly explains why psychiatry is the object of jaundiced suspicion.

J. LANDER

SENN, MILTON J. AND NEWILL, PHYLLIS K.: *All About Feeding Children.* Garden City, Doubleday, Doran & Co., 1944, 248 pp. $2.50.

The book deals with the feeding of children in a practical, clear, detailed, concise and scientific way. The problems of feeding are taken up in sequence from birth through childhood in an enlightening manner and in a simple style so that the book has a place for both parents and practitioner. The types and choices of foods are discussed from all points of view and in detail are covered as to "when, why, what," and how cooked.

The child's reaction to feeding, acceptance and refusal, manners and habits are clearly presented. The infant, parent, physician relationships are concisely presented. Schedules, formulas, and routines are defined. The importance of conversations, too much attention, and the consequence of crying, spoiling, and the influence of food, care and love concerned with feeding children are physiologically and psychologically discussed.

The book has a vital place in pediatrics and its full scientific discussion of feeding children offers useful information to mothers, and a practical approach in handling the feeding problems of children. The mechanics and physiology are presented with psychiatric implications which will be especially valuable to mothers and physicians concerned with feeding children.

WEIR M. TUCKER

LEVY, DAVID M.: *Maternal Overprotection.* New York, Columbia University Press, 1943, 426 pp. $4.50.

This book constitutes an excellent investigation of the problem of maternal overprotection, using case material from the Institute for Child Guidance in New York City. In order to determine the genesis of maternal overprotection, the author made a detailed study of twenty cases carefully selected as "pure forms" of maternal overprotection, eliminating for future study those which clinically were called guilt, mixed, mild, or non-maternal forms of overprotection.

The manifestations of maternal overprotection seen in the behavior of the mother were as follows:

1. Excessive contact between mother and child, such as constant companionship and excessive fondling.
2. Infantilization by the mother who performed for the child or helped him long past the usual time with dressing, feeding, etc.
3. Prevention of independent behavior by actively thwarting the child's development of self-reliance and self-confidence; for example, in strictly limiting play opportunities and accompanying the child to school.

A fourth criterion of maternal overprotection, lack or excess of maternal control, is seen in the child's behavior. The child becomes dominating and powerful over an indulgent mother but submissive to a dominating mother. In the first half of the book Dr. Levy illustrates with abundant case material and elaborate statistical tables the above criteria of overprotection.

In chapter seven there is an interesting discussion of maternal impulses. Dr. Levy points out that there is a distinct maternal drive as evidenced in the behavior of animals and young girls, in contrast to Freud's elaboration of the theory of penis-envy as the explanation for the origin of maternal love. There is an excellent chapter on the various problems of the overprotected child, but some of the most valuable contributions are those on the psychopathology, prognosis, treatment, and follow-up. The results of psychotherapy with both the child and the mother are evaluated and the importance of environmental and educational therapy is pointed out.

As a book which deals with a most fundamental human relationship it contains valuable material for all students of children's behavior. However, it is of particular value to those engaged in the treatment of children's emotional problems. It should be read carefully and consulted frequently by psychotherapists dealing with either mothers or their children.

OTHILDA KRUG

BECK, S. J.: *Rorschach's Test.* New York, Grune & Stratton, 1944, 219 pp. $3.50.

Any book concerned with the Rorschach test is inevitably of interest to the proponents of psychosomatic medicine. Few trustworthy and penetrating psychological tools are available for the study of the total personality and among these the Rorschach procedure is probably the most distinguished. In the present volume Beck continues his pioneer work with this test, which he first expertly represented in this country after an apprenticeship in Zurich with Oberholzer, himself a direct disciple of Rorschach. Against this historical background the title of the book is significantly laconic. Many "Rorschachers" have departed radically and, according to Beck's implication, dangerously from the original test. Some are self-styled experts and others have little adequate training or experience with the technique in its various clinical applications. Since the Rorschach of all tests is most technical and least adapted for popular use, Beck is concerned over its abuse. The title—*Rorschach's Test*—sets forth in a word what he hopes to achieve by the publication.

The present work, of which this volume is Volume I, is intended as a definitive text book for the administration, scoring and interpretation of the test. The author's former work on the subject, "Introduction to the Rorschach Method," published in 1937, failed in this purpose for most of those who turned to it without considerable other background. It took too much for granted. In the new work Volume I is devoted to an exposition of the method of administration and—for the remaining 95% of the book—to the various detailed problems of scoring, each test factor being considered in turn. The volume which is promised within the succeeding months will complete the exposition by considering the principles of interpretation as illustrated by numerous clinical examples.

In his preface (p. xi) to the present volume the author thus defines its aim: "The sole purpose here is to provide students with a moderately steady frame of reference. The hope is that, given such a manual of constant usage, it will be possible to work with the test as a stable instrument. Findings by any two students or by the same one at different times, can then be compared. To the extent that this is achieved, Rorschach test scoring would become an *operationalist* technic. The associations and the methods of treating them are public and repeatable. Response summary can be matched with response summary, entirely on the basis of quantitative findings, and irrespective of the psychologic values of the test factors. We can have a comparison of a behavior pattern, stated in Rorschach symbols, with other behavior patterns so stated."

With the above purpose in mind Beck cites numerous Rorschach responses verbatim under the various scoring categories in succession. Each response is scored and the basis for the assigned score discussed. Where needed, samples and, where possible, tables for the guidance of the score are given under the various rubrics. In this connection the Form response is particularly well represented. A new system of code members is provided for the recurrent Detail and Rare Detail responses found for the ten cards. It thus becomes possible in using this manual or in writing up test results to refer conveniently to the portions of the blot to which the subject has reacted without invoking a series of often indeterminate words.

The scoring categories here included do not differ very much from those originally used by Rorschach himself. Beck is, in a sense, a defender of the faith though he admits readiness to accept new scoring categories and symbols once they have proved empirically to be an advance over the original test procedure. "In the absence of such proofs in the newer literature, my sanctions," he writes (p. xii), "continue to be the experience of Rorschach, Oberholzer and Levy." The scoring categories covered accordingly include the well-known W, D, Dd, M, C, F+ and F—, and P. Shading responses are given a somewhat novel treatment but the most original departure concerns Beck's own organization category Z.

Some characteristic features of the treatment may be mentioned. Popular responses are limited on available evidence to 20 in number and these are listed. Here as wherever else possible a statistical criterion is adopted as a basis for the scoring. Movement responses are strictly limited to the

human variety in keeping with the practice of Rorschach and of Oberholzer. Animal responses are not regarded as representative of the peculiar empathic identification which justifies the scoring of M. Light-determined responses include vista—three dimensional effects due to perspective—and chiaroscuro involving flat gray. Rorschach's original Do (oligophrenic) category is modified in keeping with later experience to the Hdx or Adx categories when a subject sees part of a human or animal instead of the whole usually reported. Rorschach's unconfirmed view that this type of response is representative of low-grade mentality is superseded by an interpretation in terms of anxiety—for which X stands.

The organization response—Z—represents Beck's most original contribution though based upon suggestions contained in Rorschach's own statements. When two or more parts of the blot figure are seen in relation to one another with a resultant emergence of new meaning the Z score is applied. This category aligns itself with the W and M factors as indicating creative or generalizing capacity but appears to reveal aspects of the personality which the other two categories less specifically indicate. On the basis of considerable research and careful statistical evaluation, examples for the scoring of Z in the various figures are given in the text and a table in the Appendices makes available the Z values for various types of organization encountered in the ten figures.

An evaluation of the book must inevitably emphasize the positive features of which it has so many. The conservatism of the author will strike many users of the method as salutary. It is easy to be carried away by intuitive fancy in almost any projective procedure. By emphasizing the objective and, where possible, the statistical validation of the scoring categories Beck has done much to make the already-mentioned conservatism progressive. He has not, however, sacrificed psychological meaning by making clinical judgment secondary to statistical objectivity.

On the whole the book will probably be easier for most students to use than the already available texts because, for one thing, it employs a minimum of scoring categories. It is true that the examples of responses given by Beck are not always easy to follow; that some of the discussions of the scoring categories, e.g., F+, could with profit be expanded; and that an occasional inconsistency mars the going. But such minor weaknesses are inevitable in a first edition. In future editions improvements may undoubtedly be expected. One such emendation that cannot be too strongly recommended is a longer and more complete discussion of how much constitutes one response for scoring purposes.

The second volume of the present work, which will complete the discussion of the method by adding the all important principles of interpretation and provide representative examples of total records, will be awaited by many with eagerness.

SAUL ROSENZWEIG

New Goals for Old Age. Edited by George Lawton. New York, Columbia University Press, 1943, 185 pp. $2.75.

The fifteen papers which comprise this book orient principally the social worker, the psychologist and the layman in respect to the mental, behavioral, social and economic problems of the ages. The various chapters, written from different points of view in accordance with the professions and status of the authors, are all intensely interesting and enjoyable. Objective treatment is given such subjects as "Aging Mental Abilities and Their Preservation," "The Older Person in the Changing Social Scene," "Patterns of Living" in an institution and in the community; occupational and work therapy, interests and activities; and discussions on aging mental abilities, mental health principles, and mental diseases.

The general viewpoint from which the book is written reveals throughout psychological understanding that an aged person is as he is because of his biological inheritance and the environmental factors which acted upon him from infancy, through childhood, adolescence and maturity. With the distribution of population shifting from the former large proportion of infants to a constantly increasing proportion of the elderly, the problems of old age can no longer be ignored. As George Lawton has stated, "In the coming decades, there will be more and more people over sixty dying. The necessity of finding ways to meet the varied needs of old people will grow steadily more imperative. We must therefore remember that a new view of childhood gradually developing within the past century ultimately gave rise to real children who know a happier enriched home and school life because of changed attitudes toward the possibilities of childhood. In the same way, students of old age care who do not easily find examples of a mentally hygienic and a wholly useful and admirable senescence, must invent such a kind of later maturity. Should this happen, the next century may be one of the 'maturate', just as the last one was of the child."

Two thousand years ago Cicero discoursed on the assets of senility and the contributions which were and could be made by the aged. But for the past twenty centuries his essay has been read only by intellectuals or students in classical literature, his ideas remaining untried. But now old age guidance centers are being organized; the aged, who for so long have been treated with indifference or were ignored as they were relegated to waiting rooms for death, are at last coming into their own.

Although this is an excellent book for everyone—professional people in need of orientation to the problems of the aged, business executives who appreciate enlightenment, and laymen (the young who regard with despair their approaching senility, the old who have the wisdom of the past, faith in the present, and hope for the future)—it contributes nothing new to the field of psychosomatic medicine (nor was it so intended). Of special interest, however, are the very excellent papers of Dr. Nolan D. C. Lewis ("Applying Mental Health Principles to Problems of the Aging") and Dr. Samuel W. Hartwell ("Mental Diseases of the Aged").

Recognizing the excellent points of this book, the reviewer feels keenly the lack of consideration given to the psychoanalytic—dynamic point of view. For every period of life the "libido positions" are of great importance. It would have been of much interest had some emphasis been given to the meaning of the regression in old age to former ego-

reactions and libido-organizations in accordance with the knowledge contributed by the theory and practice of psychoanalysis. As we know, manifestations of such regressions are reflected in specific behavior and character formations typical of old age which should have been discussed also in the light of psychoanalysis.

EDOUARDO WEISS

BACHMEYER, ARTHUR C. AND HARTMAN GERHARD: *The Hospital in Modern Society*. New York, The Commonwealth Fund, 1943, 768 pp. $5.00.

Up to now a student of hospital affairs was in a somewhat peculiar situation. He was fortunate in having Malcolm T. MacEachern's classic volume on Hospital Organization and Management (last edition, 1940), but often he needed personal expert guidance in order to select intelligently other valuable but widely dispersed publications on various subjects in the field of "hospitiology."

This book contains adjusted reprints of one hundred-fifty articles which were skillfully compiled from the American periodical literature on hospital work and related activities. The presented material provides excellent information and orientation on many basic and actual hospital problems. References for further reading are added to each of the book's twenty-nine chapters.

Some of the articles are of special interest from the standpoint of psychosomatic medicine, as: "Personality and Psychology in the Hospital" by G. Harvey Agnew, "Staff Relationships that Focus Service on the Patient" by E. M. Bluestone, "Dealing with Mental Diseases" by Adolf Meyer, and "A Basis for Mutual Understanding between Doctors and Social Workers" by Joseph C. Doane.

G. Harvey Agnew outlines the psychology of dealing with patients: Most people are suspicious of hospitals or even prejudiced against them. The average patient is introspective, anxious, critical, and often unfavorably impressed by minor incidents such as a hasty or impersonal reception at the hospital, an unprepared room, a bed which is too cold, a lukewarm meal, or a curt command. Agnew calls the handling of personnel within a hospital an art. The interrelationship of the personnel must be carefully planned, but above all, there must be "a family spirit, a feeling that each one is working with 'esprit de corps' for the patient and for the hospital." In a similar manner, E. M. Bluestone, in his paper, explains how "a proper spirit in the hospital means a contented patient in so far as this can be effected in those who are physically ill."

Adolf Meyer points out that "psychiatry begins when we demand an intelligent reconstruction or genetic-dynamic formulation, with evidence . . . of our knowing the technical ultimate implications." He remarks that "in this setting our therapy has become more and more natural but also has been enriched with important procedures." Some of these procedures bring the case closer to what the general hospital with its atmosphere of direct action can furnish but there will always be "a need for the most broadly human use of the twenty-four hours of the day, with sleep, rest, play, some work, and social contact," and for this, he continues, "we need a special temperament of personnel and a special atmosphere." According to Dr. Meyer, the special hospitals are "more likely to provide unobtrusive protection, play and occupation of a type that spells opportunity for normal functioning and normal living, even for the less favored."

A. K. GEORGE

MAY, MARK A. *A Social Psychology of War and Peace*. New Haven, Yale University Press, 1943, 284 pp. $2.75.

The author first reviews the different theories of war (instinct, political, economic theories). His thesis is that peace and war are "products of human learning." He analyses how men learn to hate and to fight, to fear and to escape, to love and to defend, to follow leaders; these, according to the author, are the fundamental psychological mechanisms which have to be learned in order to make war. The psychological makeup of aggressive and defensive social movements is described and the book culminates in an examination of the psychological conditions of a future peace, combined with a very interesting analysis of the psychological evolution of the U. S. A. from 1939 to 1941.

The psychological approach of the author, the Director of the Institute of Human Relations at Yale University, is already known from his earlier publications and those of other members of the Institute, particularly John Dollard. It may be shortly characterized as an offshoot of behaviorism which has taken some cues from Freud.

The war confronts us with two fundamental psychological questions: how to make men fight, and how, once the war is over, to create a psychological climate where war can no longer thrive. The author's main thesis is that it is psychologically easier first to create an international organization and then educate people to respect it, as they now respect the national state, than vice versa. The two last chapters of the book dealing with these questions are undoubtedly its best parts. More easily than in the beginning the author escapes the shortcomings of a psychological method which is based too exclusively on the mentality of the school child and the observations made in training rats and other quadrupeds. The author's statement that "enemy hating is not the chief motive for fighting" is courageous and true, and can easily be confirmed by every historian and by everyone who has ever been a soldier. But it defeats to a large extent the chapter on hating as a fundamental psychological conditition of war. The chapter on fear and escape is unsuccessful in so far as it never really gets hold of the actual psychology of the soldier. In the opinion of the reviewer the book rather often repeats true, but not very relevant statements such as the following: "Nearly all aggressive movements have aggressive leaders."

This sober and honest book brings out one fundamental difficulty of all books on war which try to be rather general and exclusively psychological. The actual question is not whether "man" is "naturally" a war lover or not. He most probably is not. The question is whether war is an indispensible element of the whole fabric of our Western society (however collectivistic it may become) or not. And that is primarily no psychological problem.

E. H. ACKERKNECHT

The Principles and Practise of Industrial Medicine. Edited by Fred J. Wampler. Baltimore, The Williams & Wilkins Co., 1943, 555 pp. $6.00.

This book, edited by Wampler and written by him and thirty-three contributors, represents a detailed and clear introduction to and cross section of modern industrial medicine. A physician suddenly confronted with the task of organizing a medical setup for a factory will be able to cull the necessary factual data and sufficient practical advice from the different chapters of the book to start his work and to avoid pitfalls. He will also find fundamental information about most of the so-called "industrial diseases."

The clear style of the different contributions, amply illustrated and underscored by tables and graphs, together with a careful and logical arrangement of the subject matter, avoiding any overlapping, makes the reading enjoyable. Meant for and used as introduction into the vast fields of industrial medicine the book has its distinct merits and will be found on many medical bookshelves.

K. E. Landé

Bernard, Theos: *Hatha Yoga.* New York, Columbia University Press, 1944, 61 pp. $3.50.

The author, an American lawyer and Ph.D. in the field of religion, relates his personal experience with Hatha Yoga, the ancient discipline of "stilling the mind" through control of the breath. In order fully to appreciate his subject, while studying in India and Tibet he found it necessary to become a true disciple of his teachers and not merely an academician. Accordingly, and with premonitory knowledge of the skepticism of his modern western readers, his account is limited to the techniques which he was taught and the traditional rationale for each. The latter is found in the voluminous annotation, and bibliography.

With the aid of 36 full page photographs of himself he illustrates the postures, and describes the steps of purification. It is not certain whether the author is actually of the belief that the swallowing and withdrawing of 22½ feet of moist cloth, or of aspirating water into the anus by movements of the abdominal musculature is "purifying" in other than a ritualistic sense. The subsequent chapters are concerned with techniques of manipulating the respiration, of evoking the subtle force of Kundalini from the base of the spine, and of finally attaining a type of orgasmic "mindlessness" and ecstatic indifference to worldly enjoyments through the complete subjugation of the mind, while assuming the necessary complicated muscular contortions. The result of his efforts is best expressed in his final statement: "The training I have here communicated faithfully; but the 'Knowledge of the True' because of its very nature must remain a mystery."

Interestingly enough Yoga can only be learnt, and its ultimate state of sublime hallucinatory experience attained only under the careful and loving guidance of the Guru or teacher. It "should be taught to a guileless, calm and peaceminded person who is devoted to his teacher and comes of a good family." In these facts lie the disciple's ability to "subdue his mind."

From the standpoint of the psychiatrically oriented reader this ancient Indian version of "healthy body, healthy mind" with its curious admixture of mysticism and claim of universal panacea is revealing of the sublimatory nature (in the Freudian sense) of all such personal mystic experience. Because of the scholarly efforts of the author, this treatise can be studied as a sourcebook of body symbolism, and a deliberate approximation to the probably related condition of catatonia.

H. M. Serota

BOOK NOTES

McCombs, Robert.: *Internal Medicine in General Practise.* Philadelphia, W. B. Saunders Co., 1943, 694 pp. $7.00.

Another synopsis of internal medicine and its allied arts in 694 pages. In spite of the fact that the subject is concisely recorded the author manages to hold the reader's interest. The role of modern laboratory tests is adequately covered, as are many other aspects which go to make this volume a satisfactory handbook.

Although the importance of psychosomatic medicine is appreciated, the space allotted to the subject is meager.

I. Arthur Mirsky

Castallo, Mario A., and Walz, Audry: *Expectantly Yours, A Book for Expectant Mothers and Prospective Fathers.* Illustrated by Helen G. Schad. New York, The Macmillan Co. 1944, 105 pp. $1.75.

In the author's opinion, the body's instinct is not very trustworthy and therefore "the pregnant woman should have care as exacting as in pneumonia; she in turn should be as obedient to her doctor as if she were diabetic."

It is evident that the authors do not believe in coddling the new arrival, but approve of early discipline. "From the first day home, let the baby know what's what." (p. 97).

Pregnancy, normal delivery and taking care of the newly born baby are discussed in conventional manner.

Martin Grotjahn

Barach, Alvan L.: *Principles and Practices of Inhalational Therapy.* Philadelphia, J. B. Lippincott Co., 1944, 315 pp. $4.00.

The methods and indications of inhalational therapy are presented in detail in order to enable the physician to choose the most efficient treatment.

Martin Grotjahn

BOOKS RECEIVED

Best, Charles Herbert, and Taylor, Norma Burke: *The Living Body; a Text in Physiology.* Revised Edition. New York, Henry Holt & Co., 1944, 593 pp. $3.90.

Breckenridge, Marian E.: *Child Development; Physical and Psychological Growth Through the School Years.* Philadelphia, W. B. Saunders Co., 1943, 592 pp. $3.25.

Du Bois, Cora: *The People of Alor.* Minneapolis, Univ. of Minnesota Press, 1944, 654 pp. $7.50.

Goldring, William, and Chasis, Herbert: *Hypertension and Hypertensive Disease.* New York, Commonwealth Fund, 1944, 268 pp. $3.50.

HENRY, JULES, and HENRY, ZUNIA: *Doll Play of Pilaga Indian Children*. New York, American Orthopsychiatric Asso., 1944, 132 pp. $3.00.

KARPMAN, BEN: *Case Studies in the Psychopathology of Crime*. Volume 2. Baltimore, Lord Baltimore Press, 1944, 738 pp.

KARNOSH, LOUIS J., AND GAGE, EDITH B.: *Psychiatry for Nurses*. St. Louis, The C. V. Mosby Co., 1944, 339 pp. $2.75.

KLEIN, DAVID BALLIN: *Mental Hygiene; the Psychology of Personal Adjustment*. New York, Henry Holt & Co., 1944, 511 pp. $4.00.

LINDNER, ROBERT M.: *Rebel Without a Cause; The Hypnoanalysis of a Criminal Psychopath*. New York, Grune & Stratton, 1944, 310 pp. $4.00.

NORWOOD, WILLIAM FREDERICK: *Medical Education in the United States before the Civil War*. Philadelphia, Univ. of Pa. Press, 1944, 503 pp. $6.00.

Parent-Teacher Organization, Its Origins and Development. Chicago, National Congress of Parents & Teachers, 1944, 206 pp. $1.25.

Psychiatry and the War. Edited by Frank J. Sladen. Springfield, Ill., Charles C. Thomas, 1943, 454 pp. $5.00.

PORTIS, SIDNEY A.: *Diseases of the Digestive System*. Second Edition. Philadelphia, Lea & Febiger, 1941, 934 pp. $10.00.

Psychosomatic Medicine. Proceedings of the Second Brief Psychotherapy Council. Chicago, Institute for Psychoanalysis, 1944, 60 pp. $.75.

Psychotherapy for Children. Group Psychotherapy. Proceedings of the Second Brief Psychotherapy Council. Chicago, Institute for Psychoanalysis, 1944, 57 pp. $.75.

PUGH, WINFIELD SCOTT: *War Medicine, A Symposium*. New York, Philosophical Library, 1943, 565 pp. $7.50.

RICHARDS, ESTHER LORING: *Introduction to Psychobiology and Psychiatry*. St. Louis, C. V. Mosby Co., 1941, 357 pp. $2.50.

SELLING, LOWELL S.: *Murder, Riot and Statistical Studies*. Scientific Reports from the Psychopathic Clinic of the Recorder's Court of the City of Detroit, 1944, 76 pp. $2.00.

SELLING, LOWELL S.: *Synopsis of Neuropsychiatry*. St. Louis, C. V. Mosby Company, 1944, 500. $5.00.

SOLOMON, HARRY C., AND YAKOVLEV, PAUL I.: *Manual of Military Neuropsychiatry*. Philadelphia, W. B. Saunders Company, 1944, 764 pp. $6.00.

STEKEL, WILLIAM: *The Interpretation of Dreams; New Developments and Technique*. New York, Liveright, 1944, 2 volumes, 310 pp., 312 pp. $10.00.

STRACHEY, ALIX: *A New German-English Psycho-Analytical Vocabulary*. Baltimore, Williams & Wilkins Co., 1943, 96 pp. $2.50.

TAFT, JESSIE, ed.: *A Functional Approach to Family Case Work*. Philadelphia, Univ. of Pa. Press, 1944, 217 pp. $2.50.

TREDGOLD, A. F.: *Manual of Psychological Medicine*. Baltimore, Williams & Wilkins Co., 1943, 300 pp. $5.00.

War Psychiatry. Proceedings of the Second Brief Psychotherapy Council. Chicago, Institute for Psychoanalysis, 1944, 54 pp. $.75.

YOUNG, KIMBALL: *Social Psychology*. 2nd Edition. New York, Crofts, 1944, 586 pp. $4.00.

NOTE TO SUBSCRIBERS

The Board of Editors announces that, because of the growing interest in the field of psychosomatic medicine and the resultant body of material which is being submitted, the Journal PSYCHOSOMATIC MEDICINE, will be published on a bimonthly basis beginning with Volume VII. To meet the increased cost of publication, the subscription rate will be advanced from $6.00 to $6.50 per year, effective November 1, 1944.

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NOTE TO CONTRIBUTORS

A number of questions have been raised by contributors as to the nature of the material which the Editors wish to consider for publication.

In general, the purposes of the Journal are stated on the inside back cover. In addition, the following observations may be of assistance.

Although the Journal is now the official publication of the American Society for Research in Psychosomatic Problems, it welcomes suitable contributions from anyone. The Society requires that papers presented at meetings of the Society must, however, first be considered by the Journal before being submitted elsewhere.

Psychosomatic medicine is not a medical specialty, parallel with internal medicine or psychiatry, but an approach which might be applicable to almost any medical, psychological or physiological problem. The consequence is that nearly anything the Journal publishes might be suitable for one or another of the specialized scientific journals, yet its suitability for this Journal depends not only upon its scientific excellence but also upon its pertinence to some specific issue involving observation or experiments on both personal reactions and organic reactions.

The editors are not disposed to accept for this Journal manuscripts which present purely psychiatric material without observations and data relative to physiological events, or material relating to any of the specialties of internal medicine which is not accompanied by sufficiently adequate psychological observations to throw light on the psychosomatic mechanisms involved.

THE EDITORS.

NOTE TO SUBSCRIBERS

During the past year PSYCHOSOMATIC MEDICINE has more than doubled its circulation. Our paper quota was insufficient to meet this increase and we applied to the War Production Board for an additional paper allotment. Because so large a number of the new subscriptions came from members of the Armed Forces, the War Production Board granted us additional paper on condition that we make certain economies in our use of paper and in the format of the journal. It will therefore be necessary to print only 80 pages per issue instead of 100 as in the past. In addition we are using a 45 pound paper instead of a 50 pound paper, we have added two lines per page, and are using continuous makeup for the section, REVIEWS, ABSTRACTS, NOTES AND CORRESPONDENCE. If our present growth trend continues, it may be necessary to make further economies, but at present, as the result of these changes, the same amount of material can be printed.

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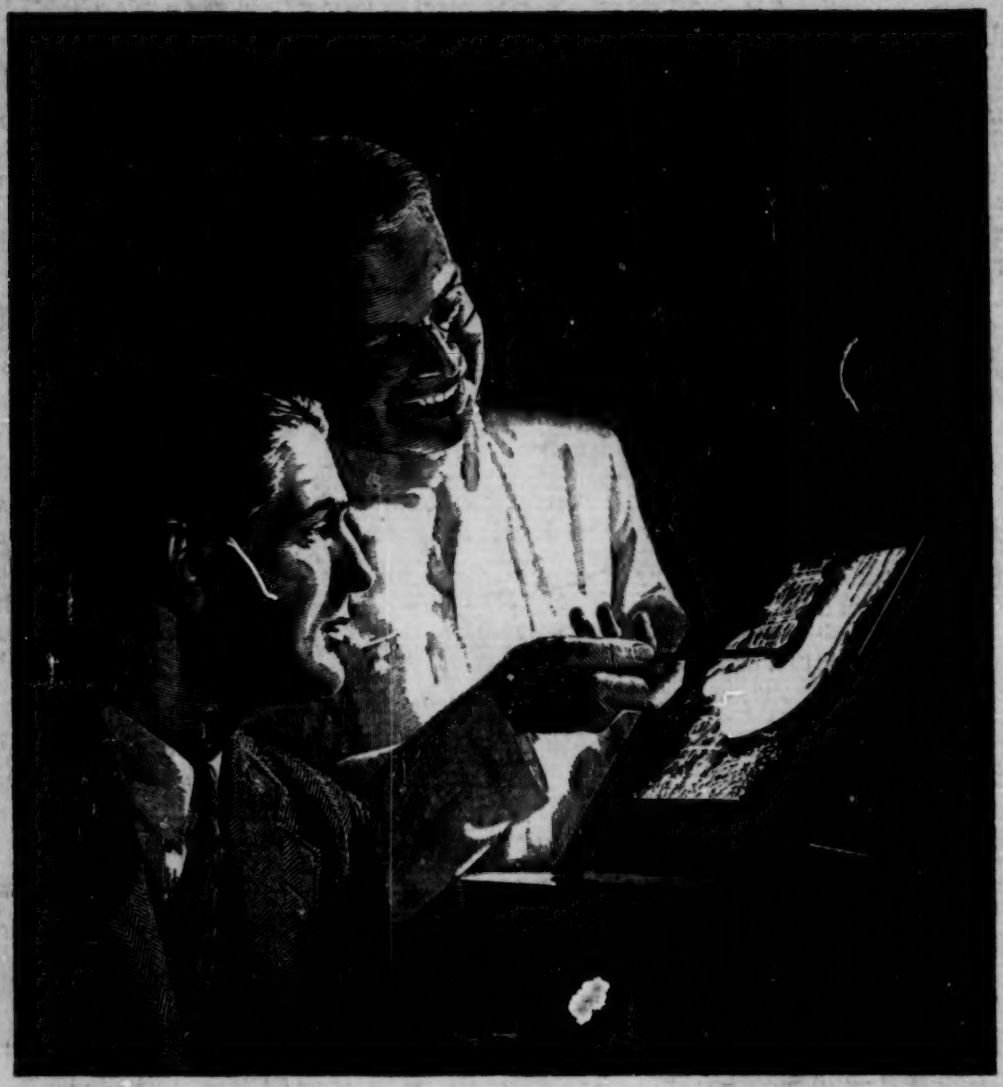

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